Introduction

What is the Toxics Release Inventory?

The Toxics Release Inventory, or TRI, is a publicly available data set containing information reported annually for toxic chemicals manufactured, processed, or otherwise used by certain facilities in Delaware and throughout the United States. Annually, these facilities report releases and waste management information for covered chemicals. The reportable list of toxic chemicals for 2003 included 582 individual chemicals and 30 chemical categories. TRI was established in 1986 under Title III, Section 313, of the Federal Superfund Amendments and Reauthorization Act (SARA 313) to provide information to the public about the presence and release of toxic chemicals in their communities. Title III is also known as the Emergency Planning and Community Right-to-Know Act (EPCRA).

Facilities report TRI information to the U.S. Environmental Protection Agency (EPA) and to the State in which the facility is located. In Delaware, the EPCRA Reporting Program within the Department of Natural Resources and Environmental Control (DNREC) receives and compiles TRI data from facilities located within the State. The EPCRA Reporting Program maintains a database that is updated as new reports are received. The database currently contains seventeen years of reported data. Most releases reported under TRI are also regulated through Federal and/or State permits.

This report contains detail from every 2003 TRI report and revision from Delaware facilities filed with and received by DNREC as of November 1, 2004. Several types of analyses are presented based on this data and data from prior years.

A second, less detailed report that provides a less technical perspective of the data presented here is also available. See page 48 for details.

Reporting Requirements

A facility is required to submit a report for a listed toxic chemical if the facility meets all of the following criteria:

1. Employs the equivalent of 10 or more full-time employees,
2. Is a covered industry, or is a federal facility (See Table 1 on the next page for a list of covered industries), and,
3. Manufactures or processes more than 25,000 pounds, or otherwise uses more than 10,000 pounds, of the listed toxic chemical during the course of the calendar year. Limits for specific chemicals known as PBT's (Persistent Bioaccumulative Toxics) are lower (Table 2 on page 3). Note that reporting requirements are based on these amounts and not the actual amounts released.

Note: From time to time, the EPA proposes changes in reporting requirements. It gives agencies, reporting facilities, and other interested parties time to comment on these changes prior to making a final decision about the proposed change.

Facilities that meet the criteria for reporting must submit one report for each listed toxic chemical manufactured, processed, or otherwise used above threshold quantities. Facilities must submit these reports to DNREC and EPA by July 1 of each year. The reports cover activities during the previous calendar year. It is important to note that a facility may need to report even if it has no releases of the toxic chemical, because reporting is based on the amount manufactured, processed, or otherwise used, and not the amount released.

Table 1 provides a list of covered industries along with corresponding 4-digit Standard Industrial Classification (SIC) codes. SIC codes are used to identify the type of activities performed at a facility. Each industry sector represented by facilities reporting in Delaware for 2003 is described in Table 5 on page 10.

TABLE 1
COVERED INDUSTRIES

SIC CODES	INDUSTRY
10XX	Metal Mining
12XX	Coal Mining
20-39XX	Manufacturing
4911 4931 4939	Oil and Coal Fired Electric Utilities
4953	Facilities Regulated Under RCRA Subtitle C
5169	Wholesale Chemical Distributors
5171	Wholesale Petroleum Stations and Terminals
7389	Solvent Recovery Services
	Federal Facilities

The standard report (Form R) contains general facility information and data about on-site releases, off-site transfers, and on-site waste management activities. In lieu of Form R, the short form (Form A) may be used, provided certain criteria are met. After a facility determines that it must report on a given chemical, the facility is eligible to use Form A for that chemical if:

1. The sum of the annual releases, transfers, and wastes managed on-site (known as the "reportable amount") does not exceed 500 pounds, and,
2. The total annual amount of the chemical manufactured, processed, or otherwise used does not exceed 1,000,000 pounds.

Form A, initiated in the 1997 reporting year, is a two-page report that provides facility information (essentially the same as Form R) and the identification of the chemical, but does not provide any release, transfer, or waste management data.

Recent Developments in TRI Reporting

The TRI reporting requirements change as EPA seeks to improve the program through changes to the list of reportable chemicals and through program expansions. Because of these changes, considerable caution must be exercised when comparing TRI data from previous years. Some of the data presented later in this report will be adjusted for these changes in order to present the data on a more constant reporting basis from year to year. Notations will be made to indicate which data is presented with these adjustments.

In the future, the four-digit facility SIC codes will be phased out and replaced with six-digit NAICS (North American Industry Classification System) codes. Facilities will not be added or removed from the reporting requirements because of this change.

Industry Expansion

On May 1, 1997, EPA added seven industries to the list of facilities covered under TRI. Prior to the 1998 reporting year, only manufacturers (SIC codes 20XX-39XX) and federal facilities were required to report (See Table 1 on page 2). EPA included the seven new industries because facilities within these industries manufacture and use substantial quantities of TRI chemicals and engage in activities related to those conducted by manufacturing facilities. The greatest impact to Delaware is the Electric Utilities (4931). The industry expansion significantly increased the amount of reported releases. This did not necessarily represent an increase in toxic releases in Delaware, but rather additional information that was made available to the public. Again, some of the data presented later in this report will be adjusted for these changes in order to present the data on a more constant reporting basis from year to year.

Chemical List Changes

The number of reportable chemicals substantially increased for the 1995 reporting year and beyond, including the addition of over 200 chemicals and 6 chemical categories. In response to the increased reporting burden on industry resulting from the chemical list expansion of 1995, EPA initiated the use of Form A described on page 2. The only recent significant deletion was phosphoric acid in 1999. It was reported by 11 facilities in 1998.

Persistent, Bioaccumulative, Toxic (PBT) Chemicals

For reporting year 2000 and beyond, EPA established substantially lower reporting thresholds for 15 chemicals and 3 chemical categories that are highly persistent and bioaccumulative in the environment (PBT's). Five chemicals were also added to the PBT list in 2000. The new thresholds apply regardless of whether the PBT chemical is manufactured, processed, or otherwise used. Table 2 provides a list of these PBT chemicals and their thresholds.

Beginning with reporting year 2001 and beyond, lead and lead compounds also have a reduced threshold of 100 pounds, down from the previous 25,000 pounds for manufactured and processed and 10,000 pounds otherwise used thresholds, except lead contained in stainless steel, brass, or bronze alloys.

TABLE 2
PBT CHEMICALS AND REPORTING THRESHOLDS
(pounds/year)

Chemical or Chemical Category	Threshold
Aldrin	100
Benzo[g,h,i]perylene	10
Chlordane	10
Dioxin and dioxin-like compounds	0.1 grams
Heptachlor	10
Hexachlorobenzene	10
Isodrin	10
Lead *	100
Lead compounds *	100
Mercury	10
Mercury compounds	10
Methoxychlor	100
Octachlorostyrene	10
Pendimethalin	100
Pentachlorobenzene	10
Polychlorinated biphenyls (PCB's)	10
Polycyclic aromatic compounds	100
Tetrabromobisphenol A	100
Toxaphene	10
Trifluralin	100

* Lower Threshold Beginning with 2001 Reports

Lead is a naturally occurring bluish-gray metal found in small amounts in the earth's crust. Lead can be found in all parts of our environment. Much of it comes from human activities including burning fossil fuels, mining, and manufacturing. Exposure to lead can happen from breathing workplace air or dust, eating contaminated foods, or drinking contaminated water. Children can be exposed from eating lead-based paint chips or playing in contaminated soil. Lead can damage the nervous system, kidneys, and reproductive system. Lead is listed as a possible carcinogen by the International Agency for Research on Cancer. Additional release information on all PBT's reported to the Delaware TRI program can be found starting on page 37.

TABLE 3
CARCINOGENS REPORTED BY DELAWARE FACILITIES FOR 2003

CHEM NAME	IARC	NO. OF REPORTS
Acrylonitrile	2A	1
Benzene	1	7
1,3-Butadiene	2A	2
Chromium Compounds	1	8
Cobalt Compounds	2B	2
Dichloromethane	2B	1
1,3-Dichloropropylene	2B	1
Diethyl Sulfate	2A	1
Ehtylbenzene	2B	6
Ethyl Acrylate	2B	2
Ethylene Oxide	1	2
Formaldehyde	2A	2
Hexachlorobenzene	2B	1
Lead	2B	5
Lead Compounds	2B	14
4,4'-Methylenebis(2-Chloroaniline)	2A	1
Nickel	2B	3
Nickel Compounds	1	6
Nitrobenzene	2B	1
P-Chloroaniline	2B	1
Polychlorinated Biphenyls (PCB's)	2A	1
Polycyclic Aromatic Compounds	2A,B	12
Propylene Oxide	2B	1
Styrene	2B	7
Tetrachloroethylene	2B	1
Toluene Diisocyanate (Mixed Isomers)	2B	2
Trichloroethylene	2A	2
Vinyl Acetate	2B	2
Vinyl Chloride	1	2
	Total =	97

Carcinogenic TRI Chemicals

Some chemicals are reportable under TRI because they are either known or suspected human carcinogens. Known human carcinogens are those that have been shown to cause cancer in humans. Suspected carcinogens are those that have been shown to cause cancer in animals. Table 3 contains those known and suspected carcinogens that were reported by Delaware facilities for 2003. Next to each chemical is its International Agency for Research on Cancer (IARC) rating as a: Known (1), Probable (2A), or Possible (2B) carcinogen. Polycyclic aromatic compounds is a class of chemicals with chemicals in both 2A and 2B IARC classifications. Of the 9.6 million pounds of TRI chemicals reported by facilities as released on-site to the environment in 2003, 6.1% (591,000 pounds) were known or suspected carcinogens. Releases on-site of all carcinogens decreased 2% compared to 2002 data and decreased 31% since its peak in 1998. For additional information on cancer rates and causes, please go to the Public Health cancer web site listed in the "For Further Information" section on page 48. Additional carcinogen detail is presented in the Trend Analysis section on page 46.

Pollution Prevention/Reduction Programs in Delaware

The Delaware Pollution Prevention Program in the Department of Natural Resources and Environmental Control (DNREC) facilitates the implementation of pollution prevention by industry, government and society. The Pollution Prevention Program (P2 Program) serves a non-regulatory function to provide information, technical assistance, training, and leadership on issues related to reducing and eliminating the generation of wastes and pollutants. The early years of the P2 program concentrated on industry and its wastes. In recent years the program has assisted all aspects of Delaware's society, including expanded efforts to schools, environmental organizations, commercial and service businesses, and to state government itself.

Data for TRI reportable chemicals and other chemicals is becoming increasingly more available to the public. This public awareness has focused attention on the existence and quantity of these chemicals and on their management and possible reduction. Although EPCRA does not require a facility to reduce releases of chemicals reportable under its programs, many companies and facilities have implemented programs to reduce or eliminate releases of these chemicals. These programs may take the form of efficiency improvements, reuse, recycling, energy recovery, or material substitutions. The benefits of these programs are reduced raw material and waste disposal costs and reduced risks associated with the toxic chemicals. Also, these reductions demonstrate corporate responsibility to the facility neighbors, and improve the corporate image with the public.

There are numerous programs within DNREC that impact the management of TRI chemicals through the issuance of permits or through other regulatory and non-regulatory activities. Most releases reported under TRI are also regulated through air emission, water discharge, and/or land disposal permits. Potential sources of toxics undergo technical reviews through which potential threats to the environment and to human health are reviewed prior to issuance of a permit. For example, the Engineering and Compliance Branch in the Air Quality Management Section enforces a provision in the Clean Air Act Amendment of 1990 that targets the control of hazardous air pollutants (HAPs). Nearly all HAPs are also reportable TRI chemicals. In addition, the Engineering and Compliance staff monitors TRI data to assess whether a facility complies with its Air Permits for TRI chemicals. Another example is the work performed by the Accidental Release Prevention (ARP) program. The ARP staff uses the TRI data to detect possible deficiencies at a facility that might result in an increased probability of an accidental release.

The Solid and Hazardous Waste Management Branch uses the TRI report to measure reductions of releases for the Waste Minimization Priority Chemicals list. The list is a result of EPA's Waste Minimization Program and has measurable goals that Delaware is working to attain. The DNREC Pollution Prevention program offers consultations to any generator of hazardous waste that requests it. The consultation is non-regulatory and non-enforcement in nature and is aimed at helping the company to reduce any and all waste streams, including the priority chemicals.

During 2003, DNREC's Air Quality Management Section monitored ambient air quality at 10 locations around the state. For more information, please refer to the "For Further Information" section under the 2003 Delaware Air Quality Report on page 49 of this report.

TOXICS RELEASE INVENTORY

Limitations of TRI Data

The user of TRI data should be aware of its limitations in order to interpret its significance accurately.

- **NOT ALL FACILITIES ARE REQUIRED TO REPORT.** A relatively small number of facilities in Delaware are required to report under TRI based on the criteria listed on pages 1 and 2.
- **OTHER SOURCES NOT COVERED UNDER TRI ALSO RELEASE TOXIC CHEMICALS.** Other sources include small businesses, motor vehicles, and agricultural operations, as examples. For some chemicals, their use as consumer products is a significant source of releases.
- **FACILITIES ARE REQUIRED TO BASE TRI DATA ON MEASUREMENTS AND MONITORING DATA IF THESE ARE AVAILABLE**. If such data is not available, quantities may be estimated based on published emission factors, mass balance calculations, or good engineering judgment. Additional monitoring equipment and measurements are not required.
- **THE DATA ESTIMATION METHODS MAY CHANGE OR VARY.** The methods of estimating, analytical methodology, or basis of calculating data used by different facilities, or even the same facility over time, may vary, and may result in significant changes in reporting while the actual release may remain relatively unchanged. DNREC performs crosschecks of the data with other information sources to verify its accuracy, and contacts facilities concerning apparent discrepancies.
- **REVISIONS TO FORM R MAY OCCUR AT ANY TIME.** These revisions sometimes involve significant changes for data previously reported by a facility.
- **THIS DATA DOES NOT INDICATE AMOUNT OF HUMAN EXPOSURE.** An important consideration to keep in mind is that TRI does not provide an indication of potential exposure to the reported releases and cannot be used by itself to determine the impact on public health. The chemical's release rate, toxicity, and environmental fate, as well as local meteorology and the proximity of nearby communities to the release must be considered when assessing exposures. Small releases of highly toxic chemicals may pose greater risks than large releases of less toxic chemicals. The potential for exposure increases the longer the chemical remains unchanged in the environment. Some chemicals may quickly break down into less toxic forms, while others may accumulate in the environment, becoming a potential source of long term exposure. The chemical exposure of a population depends on the environmental media (air, water, land) into which the chemical is released. The media also affects the type of exposure possible, such as inhalation, dermal exposure, or ingestion.

Despite these limitations, TRI serves as a valuable screening tool to identify areas of concern that may require further investigation.

2003 Data Summary

Statewide totals of reported 2003 TRI on-site releases, off-site transfers, and wastes managed on-site are provided in Table 4. On-site releases were higher by 19.6% compared to 2002. A total of 84 facilities submitted 378 reports on 103 different chemicals. Of the 378 reports, 55 were submitted using Form A. Ammonia, toluene, methanol, xylene, polycyclic aromatic compounds, benzo(g,h,i)perylene, and zinc, lead, manganese, and copper compounds all had greater than 10 reports. As in past years, air releases, led by acid gasses, constitute the largest portion of the total on-site releases.

TABLE 4
2003 TRI DATA SUMMARY
(IN POUNDS)

	2003
No. of facilities	84
No of Form A's	55
No of Form R's	323
No. of Chemicals	103
On-site Releases	
Air	7,436,246
Water	916,287
Land	1,263,958
Total Releases	9,616,491
Off-site Transfers	
POTW's	1,432,790
Recycle	8,366,885
Energy Recovery	2,834,075
Treatment	370,126
Disposal	4,084,899
Total Transfers	17,088,774
On-site Waste Mgmt.	
Recycle	22,404,667
Energy Recovery	16,455,440
Treatment	30,282,421
Total on-site Mgmt.	69,142,528
Total Waste	95,847,792

Types of Data

Table 4 lists all the categories of data reported to Delaware and EPA under the TRI program. Within the actual reports from facilities, the data is broken down into additional sub-categories. For ease of presentation in this report, the data has been grouped into these categories as described below.

On-Site Releases: There are four categories, but no **underground injection** of chemical waste to wells is permitted in Delaware. On-site releases in Delaware are to **air, water,** or **land**. The **air** release category includes stack air collected by mechanical means such as vents, ducts, or pipes, and fugitive air escaping collection and released into the general atmosphere, including equipment leaks and evaporation. **Water** releases are to streams or water bodies, including streams, rivers, lakes, bays, or oceans. This includes releases from contained sources, such as industrial process outflow or open trenches. Water releases include TRI-reportable chemicals in runoff, including storm water runoff, are also reportable. **Land** releases (5 types) are to RCRA landfills, in which wastes are buried, surface impoundments, which are uncovered holding areas used to volatilize and/or settle waste materials, other land disposal such as waste piles or releases to land such as spills or leaks, land application/treatment in which waste containing a listed chemical is applied to or incorporated into soil, and other non-RCRA landfill.

Off-Site Transfers: Off-site transfers include transfer of chemical waste to **POTW's** (Wastewater Treatment Plants), to **recycle** operations (5 types), to **energy recovery** operations (2 types), to **treatment** operations (6 types), and to **disposal** (12 types), to facilities not at the facility generating the waste. This total of 23 sub-categories is provided for the purpose of classifying the types of final off-site waste management undertaken for each chemical.

On-site waste Management: Waste management operations at the facility generating the waste are categorized to include **recycle**, **energy recovery**, and **treatment.** These are as described above in Off-Site Transfers.

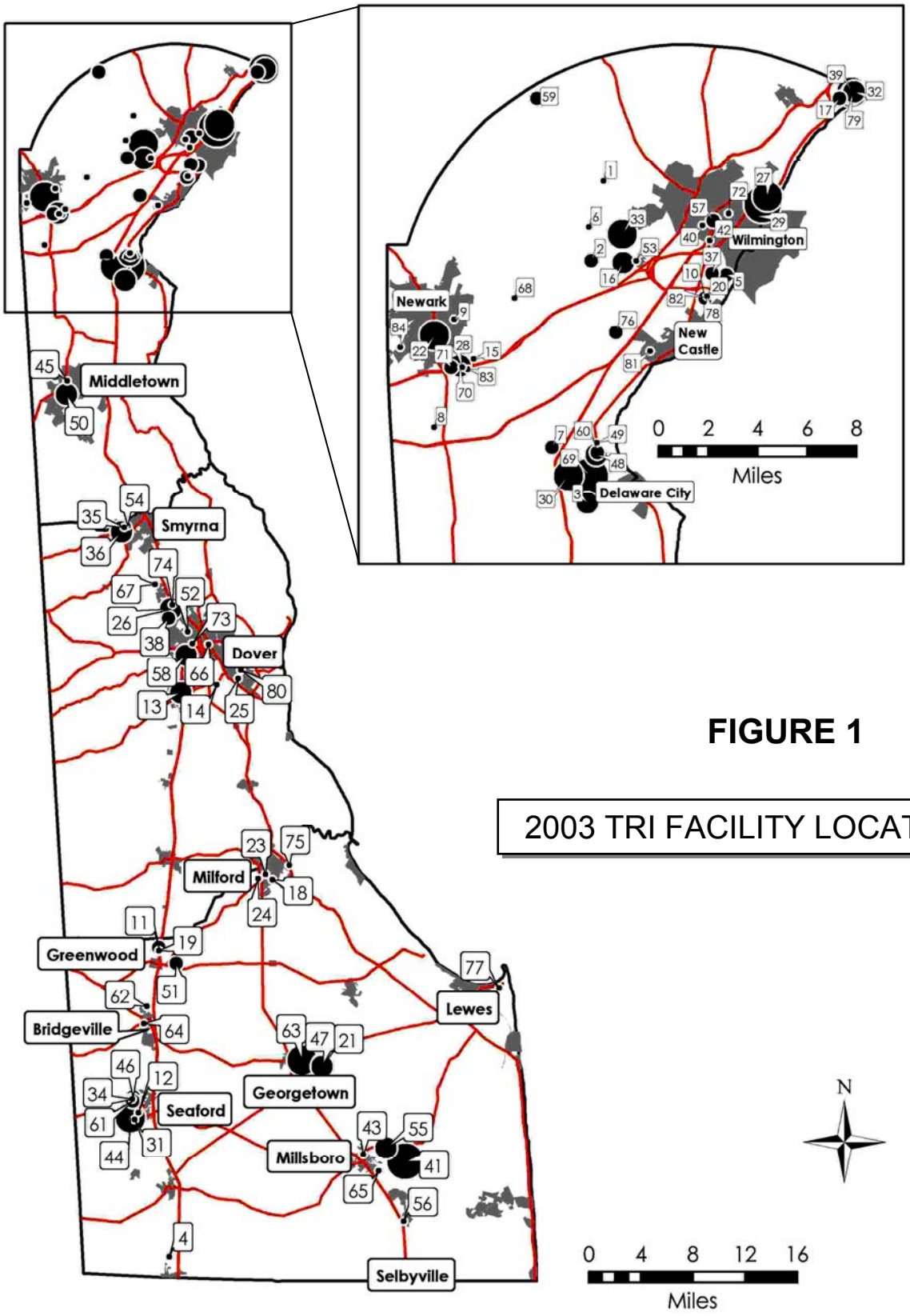


FIGURE 1

2003 TRI FACILITY LOCATOR MAP

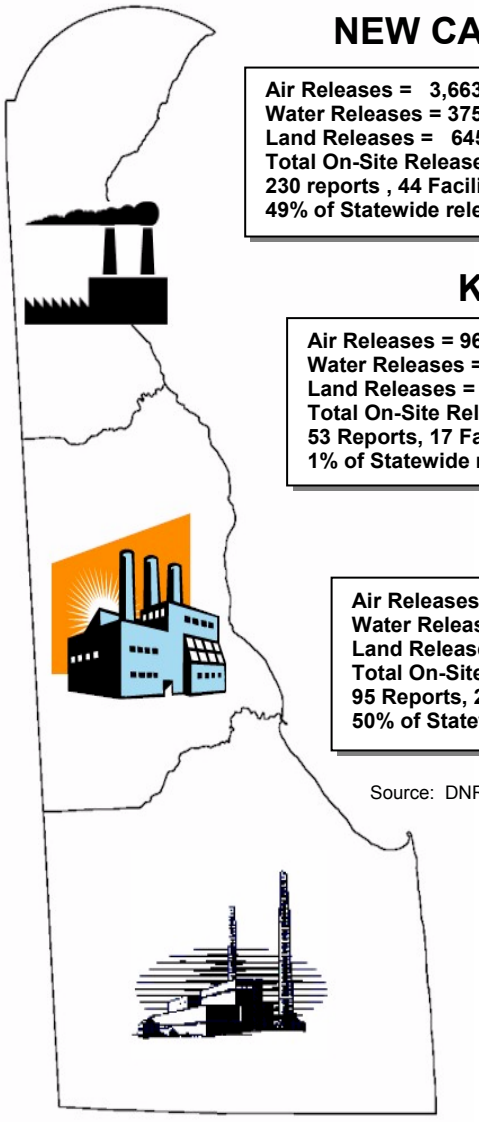
FIGURE 1 MAP KEY

MAP ID	FACILITY
1	AGILENT TECHNOLOGIES LITTLE FALLS
2	AGILENT TECHNOLOGIES NEWPORT
3	AIR LIQUIDE AMERICA
4	ALLENS HATCHERY
5	AMERICAN MINERALS
6	AMETEK
7	ARLON
8	ASTROPOWER PENCADER
9	ASTROPOWER SOLAR PARK
10	AVECIA
11	BERACAH HOMES
12	BLADES BULK PLANT
13	CAMDEL METALS
14	CARL KING
15	CHROME DEPOSIT
16	CIBA SPECIALTY CHEMICALS
17	CITISTEEL
18	CLARIANT
19	CUSTOM DECORATIVE MOULDINGS
20	CYTEC
21	D&B INDUSTRIAL PRODUCTS
22	DAIMLERCHRYSLER
23	DENTSPLY LAKEVIEW
24	DENTSPLY WEST MILFORD
25	DOVER AFB
26	DOW REICHHOLD
27	DUPONT EDGE MOOR
28	E-A-R
29	EDGE MOOR/HAY ROAD POWER PLTS.
30	FORMOSA PLASTICS
31	GARDNER ASPHALT
32	GENERAL CHEMICAL
33	GENERAL MOTORS
34	GREEN TREE CHEMICAL
35	HALKO MFG.
36	HANOVER FOODS
37	HARDCORE COMPOSITES
38	HIRSH INDUSTRIES
39	HONEYWELL
40	IKO
41	INDIAN RIVER POWER PLANT
42	INSTEEL WIRE
43	INTERVET
44	INVISTA SEAFORD
45	JOHNSON CONTROLS
46	JOHNSON POLYMER
47	JUSTIN TANKS
48	KANEKA
49	KUEHNE CHEMICAL
50	MACDERMID
51	MARBLE WORKS
52	MCKEE RUN POWER PLANT
53	MEDAL
54	METAL MASTERS
55	MOUNTAIRE FARMS OF DELAWARE
56	MOUNTAIRE FARMS FEEDMILL
57	NORAMCO
58	NRG DOVER
59	NVF YORKLYN
60	OCCIDENTAL CHEMICAL
61	ORIENT
62	PERDUE BRIDGEVILLE
63	PERDUE GEORGETOWN
64	PICTSWEET
65	PINNACLE FOODS
66	PLAYTEX PRODUCTS
67	PPG DOVER
68	PPG WORKS 32
69	PREMCOR
70	ROHM & HAAS
71	ROHM & HAAS TECH CENTER
72	ROLLER SERVICE
73	SARA LEE APPAREL
74	SERVICE ENERGY DOVER
75	SERVICE ENERGY MILFORD
76	SPATZ FIBERGLASS
77	SPI PHARMA
78	SPI POLYOLS
79	SUNOCO
80	SUNROC
81	TFL USA-CANADA
82	UNIQEMA
83	VP RACING FUELS
84	W. L. GORE OTTS CHAPEL

Figure 1 on the facing page provides the location of each reporting facility in the state. The size of the facility location marker depicts the relative size of its on-site release relative to other facilities in the state. The facility location, telephone number, and contact person is provided in Appendix B. Figure 2 below provides basic on-site release information for each county.

FIGURE 2

ON-SITE RELEASES BY COUNTY



NEW CASTLE

Air Releases = 3,663,494 Pounds
Water Releases = 375,530 Pounds
Land Releases = 645,682 Pounds
Total On-Site Releases = 4,684,706 Pounds
230 reports , 44 Facilities
49% of Statewide releases

KENT

Air Releases = 96,222 Pounds
Water Releases = 0 Pounds
Land Releases = 0 Pounds
Total On-Site Releases = 96,222 Pounds
53 Reports, 17 Facilities
1% of Statewide releases

SUSSEX

Air Releases = 3,676,530 Pounds
Water Releases =540,757 Pounds
Land Releases = 618,276 Pounds
Total On-Site Releases = 4,835,563 Pounds
95 Reports, 23 Facilities
50% of Statewide releases

Source: DNREC 2003 TRI Database 11-1-04

TOXICS RELEASE INVENTORY

SIC Industry Groups

Table 5 provides a description of each Standard Industrial Classification (SIC) industry group and the number of facilities in each group that reported in Delaware. This table also provides on-site releases, off-site transfers, and wastes managed on-site for each group. The one reporting facility in the metal mining group, American Minerals, processes metal ores that they receive by railcar.

TABLE 5
2003 TRI DATA BY PRIMARY SIC GROUP

(In pounds)

SIC CODE	INDUSTRY GROUP	NUMBER OF REPORTS	NUMBER OF FACILITIES	FORM A	FORM R	ON-SITE RELEASE	OFF SITE TRANSFERS	ON-SITE WASTE MGMT.
10	Metal Mining	5	1	0	5	7,091	0	0
20	Food Products	22	8	12	10	343,448	0	0
22	Textiles	5	2	2	3	29,126	744,943	2,639,957
24	Lumber and Wood Products	14	1	0	14	1,463	31	0
25	Furniture and Fixtures	1	1	0	1	9,454	0	0
26	Paper Products	1	1	0	1	6,411	51,094	1,950,000
28	Chemicals	124	26	8	116	1,182,933	8,311,446	29,439,327
29	Petroleum Refining and Products	59	5	6	53	1,767,618	143,088	20,521,709
30	Rubber and Plastics	15	12	4	11	53,855	205,003	133,740
32	Stone, Clay and Glass	1	1	0	1	0	3,274	0
33	Primary Metal	13	4	0	13	18,357	2,184,939	13,100,000
34	Fabricated Metal Products	4	2	0	4	10	175,603	1,700
35	Industrial Machinery and Equipment	2	1	0	2	0	13,010	0
36	Electronic Equipment Not Computers	5	3	0	5	237	4,313,554	44,590
37	Transportation Equipment	35	3	3	32	457,277	542,432	112,170
38	Measuring Instruments,	8	3	0	8	822	54,521	0
39	Miscellaneous Manufactuing	1	1	0	1	2,288	0	0
4911	Oil and Coal Fired Power Plants	43	4	1	42	5,736,094	345,836	1,199,335
5171	Wholesale Petroleum Terminals	19	4	19	0	0	0	0
97	National Security	1	1	0	1	7	0	0
	TOTAL	**378**	**84**	**55**	**323**	**9,616,491**	**17,088,774**	**69,142,528**

FIGURE 3
2003 ON SITE RELEASES BY SIC

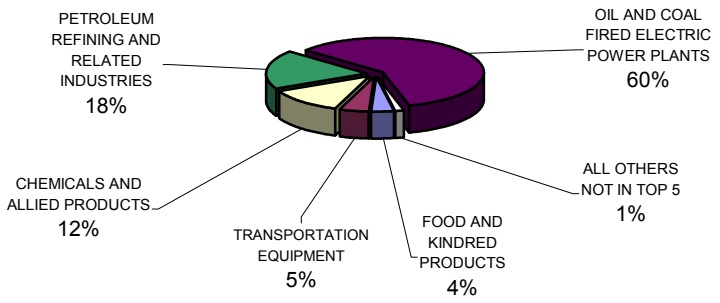


Figure 3 shows the relative contribution of each of the top 5 SIC groups to the total on-site releases and all others not in the top 5. Three of these - SIC groups 4911 (Oil and Coal Fired Power plants), 29 (Petroleum refining), and 28 (Chemicals) combined for 90% of the total on-site releases within the state. Facilities not in the top 5 industry groups contributed only 129,000 pounds on-site, or about 1.3% of the on-site release total.

On- Site Releases

On-site releases are emissions from a facility to the environment because of normal operations, including emissions to the air, discharges to surface water, disposal onto or into the ground, and underground injection. Although underground injection is an approved method for disposal is some states, it not an approved method of TRI or hazardous waste disposal in Delaware, and thus has not been reported by any facility in Delaware since TRI reporting began. Total on-site releases to air, water, and land make up about 10% of all TRI-reported wastes.

FIGURE 4
2003 ON SITE RELEASES

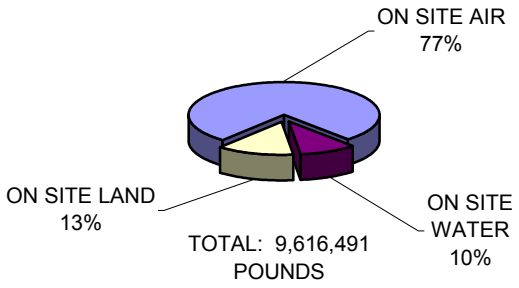
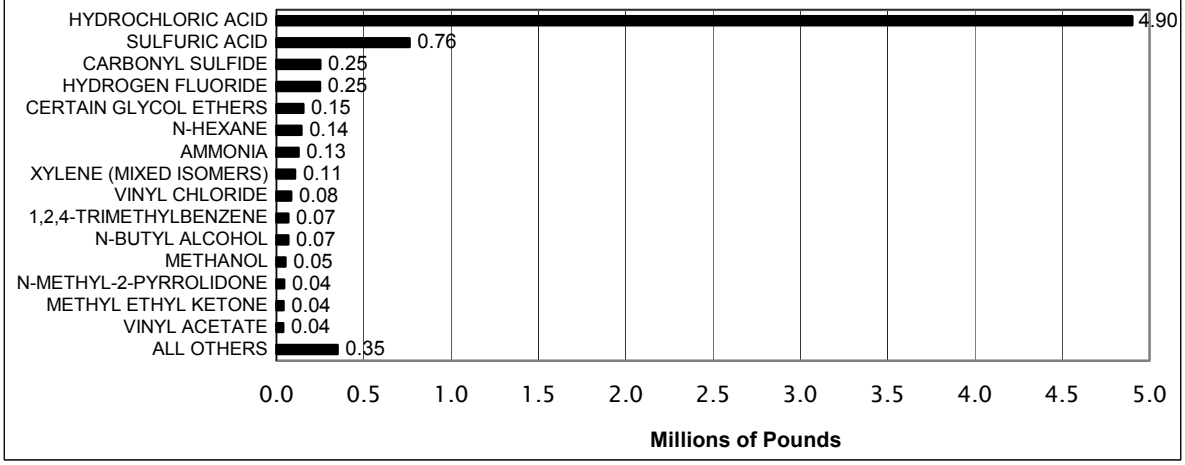


Figure 4 shows the on-site releases reported in the state. A large portion, 77% of the total on-site release, is to air. Additional analysis of on-site releases is presented in Figures 5, 6, and 7 below, showing the top 15 chemicals released to air, water, and land.

Releases to Air

Figure 5 provides an illustration of the relative release of the top 15 chemicals compared to the other 78 chemicals reported as released in 2003 to the air. As in all the years following the inclusion of power generating facilities, acid gasses top the list. Specifically, hydrochloric and sulfuric acid aerosols (gasses) and hydrogen fluoride are released from power generating facilities located in all three counties. These three chemicals comprise 80% of statewide air releases. Two facilities reported carbonyl sulfide, which accounted for 4% of all releases to air. DuPont Edge Moor was the primary reporter of this chemical. Nine facilities reported

FIGURE 5
TOP 15 CHEMICALS RELEASED TO AIR



xylene, which represents 1% of all on-site releases to air. Certain glycol ethers (2% of on-site air releases), and xylene (1% of on-site air releases) are primarily used as a solvent in paints for the automobile manufacturing industry. The two automobile manufacturing facilities in Delaware accounted for most of these releases. Ammonia (1.7% of total air release) is released from food processing, petrochemical, and chemical facilities. Two-thirds of the n-hexane release (1.3% of total release to air) was from Honeywell in its production of caulking.

Releases to Water

As can be seen in Figure 4 on page 11, releases to water were much lower than releases to air. Table 6 provides the amount of TRI chemicals released to each receiving stream that received a TRI chemical. Figure 6 on the next page shows that nitrate compounds was the top chemical released (83% of the total water release), followed by cresol (mixed isomers) (6%), phenol (5%), and barium compounds (2%). The biological treatment of nitrogen-containing compounds such as animal waste and ammonia is responsible for the formation of nitrate compounds. Perdue Georgetown was the largest reporter of nitrate compounds at 320,000 pounds, with Invista/DuPont Seaford and Premcor/ Motiva reporting significant but smaller amounts. Premcor was the only reporter of Cresol mixed isomers and phenol, by-products of refining. Barium and Manganese compounds are formed from ore refining and from impurities in coal used in the power generating facilities. DuPont Edge Moor reported 92% of the barium compounds released to water, and DuPont Edge Moor and the Edge Moor/Hay Road power plants reported 91% of the manganese compounds released to water. Cresol and phenol are products of petroleum refining and were released to water by Premcor.

TABLE 6
TRI CHEMICALS
RELEASED TO WATER BY WATERSHED

WATERSHED	NO. OF FACILITIES	NO. OF REPORTS	RELEASE (POUNDS)
Delaware River	8	74	368,638
Drawyer Creek Trib.	1	1	5
Indian River	1	3	3,105
Little Mill Creek	1	1	310
Naamans Creek	1	6	102
Nanticoke River	1	2	217,637
Red Clay Creek	2	1	6,459
Red Lion Creek	1	1	16
Savannah Ditch	1	1	320,000
Swan Creek	1	1	15
STATE TOTAL	**18**	**91**	**916,287**

Not every report shows a release to its listed watershed. For example, of the 74 reports listing the Delaware River as their destination watershed, only 58 reports show an actual release quantity to the Delaware River. The other 16 met the reporting requirements listed on page 1 and had the potential to release to the river or may have released chemicals to other media (air or land), but did not report any amounts actually released to the river.

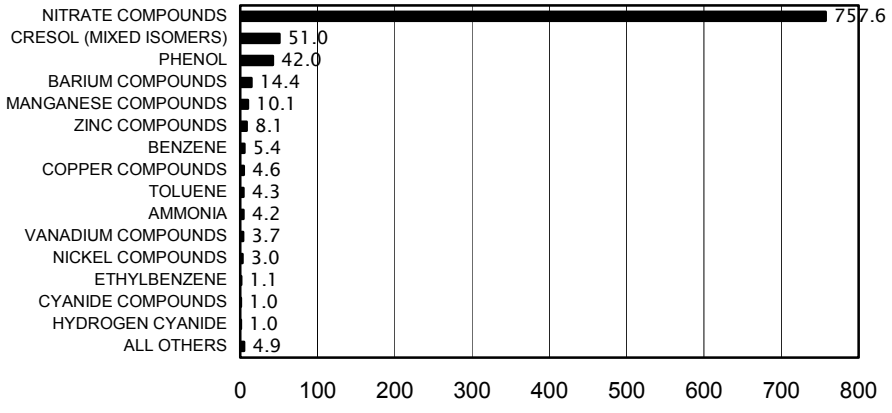
TABLE 7
TRI CHEMICALS
RELEASED TO WATER BY BASIN

BASIN	RELEASE (IN POUNDS)	PERCENT
Chesapeake	217,637	24%
Delaware Bay	658,466	72%
Inland Bays	3,120	0.34%
Piedmont	37,064	4%
STATE TOTAL	**916,287**	**100%**

Table 7 shows the total amount of TRI chemicals released to each basin in the state of Delaware. The Piedmont Basin contains lands that drain into the portion of the Delaware River above New Castle, and the Inland bays include lands that drain into the Indian River Bay/Rehoboth Bay area. All the receiving streams except the Nanticoke and Indian Rivers eventually feed into the Delaware Bay. The total amount released to water decreased by 13,000 pounds (1.4%) in 2003. Additional discussion about these releases can be found in the Trend Analysis section starting on page 39.

Figure 6 shows the relative relationship of the top 15 TRI chemicals and the 23 other chemicals reported as released to water. This clearly shows the influence that nitrate compounds had on the total. On-site water releases make up 10% of the total on-site releases.

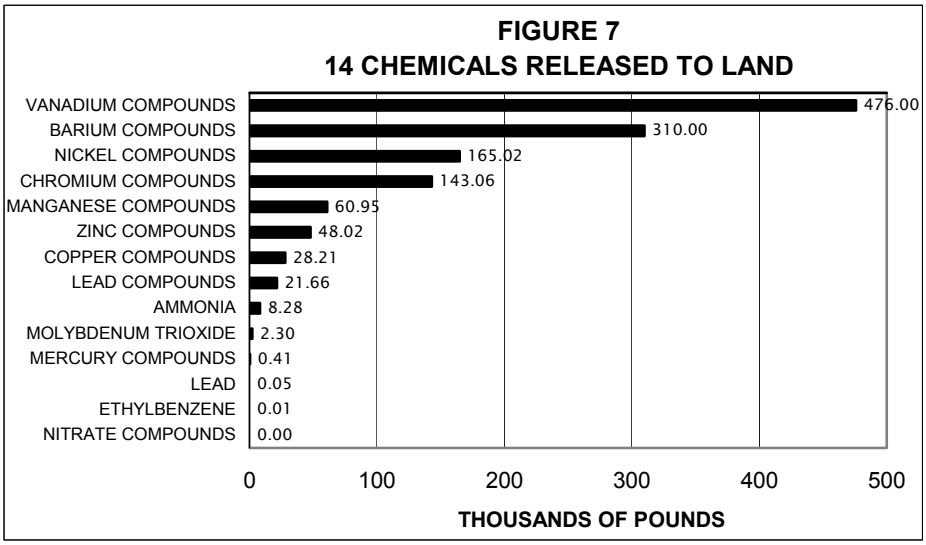
FIGURE 6
TOP 15 CHEMICALS RELEASED TO WATER



Releases to Land

Land releases, as shown in Figure 4 on page 11, are relatively small, comprising 13% of the total on-site releases. Figure 7 shows the relative contribution all 14 chemicals reported as being released to land. Nearly all the land releases are metals and metal compounds except for the small quantities of nitrate compounds, ethylbenzene, and ammonia. Most of the metals and metal compounds being reported are formed during the combustion process from metal impurities that exist in coal or crude oil. Barium and vanadium compounds comprise 62% of the total land releases. Land releases, generally the metallic compounds shown above, by the Indian River power plant and Premcor/Motiva facilities account for 99% of the total land releases.

FIGURE 7
14 CHEMICALS RELEASED TO LAND



Additional discussion about these releases and their trends can be found in the Trend Analysis Section starting on page 39.

RELEASES FROM THE TOP 15 FACILITIES

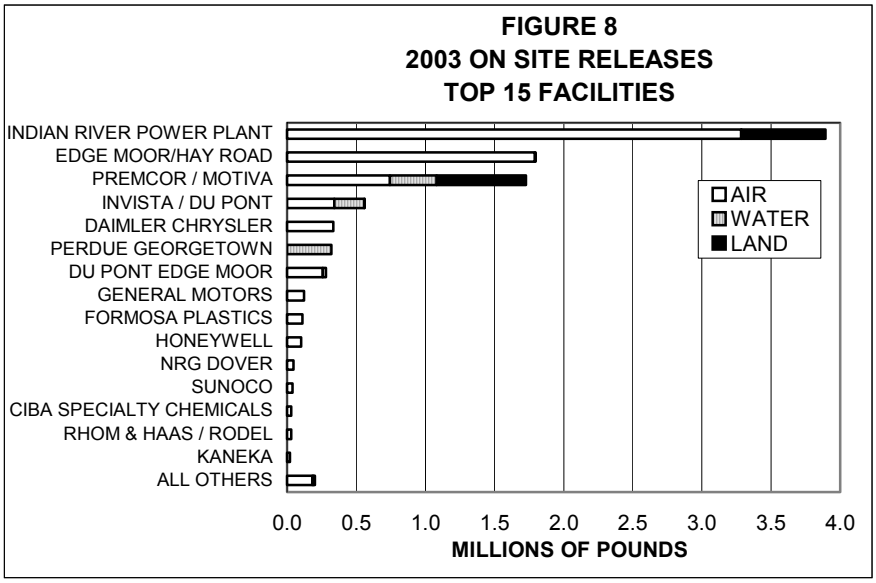


Figure 8 shows the relative contribution of each of the top 15 reporting facilities to on-site releases. The top four facilities are, or have as a significant portion of their facility, an energy generating operation. Of the on-site 9,616,491 pounds that were released statewide by all 84 facilities, the top 15 facilities accounted for 9,415,748 pounds, or 97.9% of the total on-site releases.

TABLE 8
TOP 15 FACILITIES 2002 AND 2003 RANKING BY ON SITE RELEASE
(in pounds)

2002 RANK	2003 RANK	FACILITY	2003 TOTAL AIR	2003 TOTAL WATER	2003 TOTAL LAND	2003 TOTAL ON-SITE RELEASE	2002 TOTAL ON-SITE RELEASE	2002 TO 2003 CHANGE IN RELEASES
1	1	INDIAN RIVER POWER PLANT	3,283,231	3,105	607,140	3,893,476	2,047,009	90%
2	2	EDGE MOOR/HAY ROAD POWER PLT.	1,792,081	4,525	0	1,796,606	1,980,078	-9%
3	3	PREMCOR / MOTIVA	744,251	338,444	645,038	1,727,733	1,395,056	24%
5	4	INVISTA / DU PONT SEAFORD	340,966	217,637	2,854	561,457	521,721	8%
6	5	DAIMLER CHRYSLER	334,342	0	0	334,342	371,459	-10%
4	6	PERDUE GEORGETOWN	0	320,000	1	320,001	550,160	-42%
9	7	DU PONT EDGE MOOR	257,312	22,706	0	280,018	209,042	34%
7	8	GENERAL MOTORS	122,625	310	0	122,935	284,801	-57%
8	9	FORMOSA PLASTICS	110,315	0	0	110,315	226,402	-51%
19	10	HONEYWELL	101,951	0	0	101,951	13,112	678%
11	11	NRG DOVER	46,011	0	0	46,011	55,956	-18%
10	12	SUNOCO	39,881	0	0	39,881	57,063	-30%
16	13	CIBA SPECIALTY CHEMICALS	30,371	0	0	30,371	28,151	8%
13	14	RHOM & HAAS / RODEL	29,030	0	0	29,030	34,094	-15%
12	15	KANEKA	21,621	0	0	21,621	36,660	-41%
		ALL OTHERS	182,258	9,560	8,925	200,743	228,284	-12%
		TOP 15	7,253,988	906,727	1,255,033	9,415,748	7,810,764	20.5%
		STATE TOTALS, ALL FACILITIES	7,436,246	916,287	1,263,958	9,616,491	8,039,048	19.6%

Source: 2002 and 2003 DNREC TRI Databases, November 2004

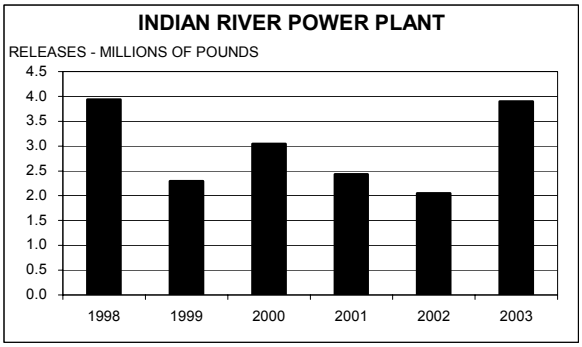
Table 8 shows the 2003 ranking of the top 15 facilities along with their 2002 ranking and the values of on-site releases for both years. The percent change in total on-site release for each of the top 15 facilities from 2002 to 2003 is also shown. Releases to the environment because of remedial actions, accidents, catastrophic events, or one-time events are included in these values. Changes in production may or may not affect releases from a facility. Other changes at the facility, such as changes the way releases are estimated, changes in raw materials or processing methods, or installation of new or improved production equipment possibly used to limit or eliminate releases of all or specific chemicals, may also affect reported releases. Some details are provided on the following pages. Interested individuals are also encouraged to contact facilities and inquire as to the reasons why changes occurred.

You may note that some facilities have had reductions in their off-site releases and their rank did not change. This is because of the general downward trend of many facilities in this group. Individual facilities must keep pace with this trend and effect their reductions at a similar rate in order to maintain their rank. In some cases significant reductions result in little, if any change in rank, and no change or a small reduction in release may result in an increase in rank.

The next several pages present a brief description of each of the top 30 facilities to provide an understanding of the use and importance of some of the TRI chemicals and basic operations at these facilities. As in Table 8, this rank is based on total on-site releases. The facility description describes the types of products manufactured at the facility and how their TRI chemicals relate to the products and the overall plant operation. The graph included with the facility description shows the trend of the facility total on-site releases since 1998, the date of the last major TRI reporting revision. Reporting revisions that have occurred since 1998 include the changes in reporting as described starting on page 3. All newly reportable chemicals within this time have been included. Comparisons must be made carefully as the scales on each of the graphs may be different. Appendix C provides a complete list of 2003 release data grouped by facility and chemical.

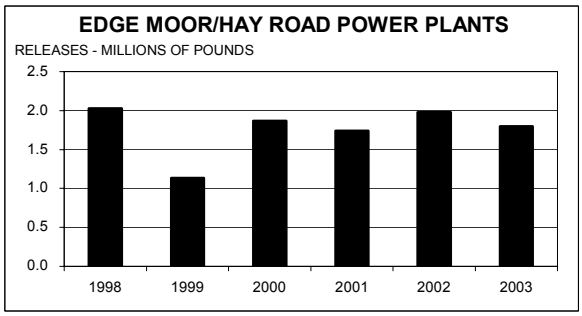
Although the TRI program itself has no limits for emissions, other DNREC and Federal programs do issue permits and limit emissions from operating facilities. TRI facilities generally operate within their applicable program limits.

Rank #1 – NRG Indian River Power Plant - Oil- and coal-fired power plants were required to report under TRI for the first time for 1998. This 784 megawatt facility, located near Millsboro, produces electricity, primarily from the combustion of coal.



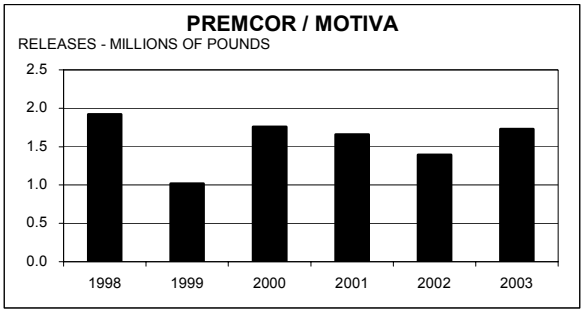
The Indian River Plant reported on sixteen TRI chemicals for 2003. Nine of these were metal compounds, three were non-metallic PBT's, one was ammonia, and the remaining three were acid gases. All compounds except ammonia are formed during the combustion process as a result of impurities within the coal. Coal consumption increased 16% in 2003, and TRI releases are generally in line with this increase. However, in 2003 actual stack sample data (as compared to EPA emission factor methods) were used to calculate hydrochloric acid releases, and this resulted in significantly higher release amounts (130%) for hydrochloric acid. Acid gasses, such as hydrochloric and sulfuric acid, along with hydrofluoric acid, accounted for 84% of the facility's on-site releases. On-site mercury releases also increased as a result of applying the stack testing and/or coal analysis. Mercury releases increased to 395 pounds, up from 165 pounds in 2002. Mercury air releases decreased to 22 pounds from 73 pounds, but mercury in ash released to on-site land increased to 373 pounds, up from 92 pounds. Metal compounds, formed as a result of impurities in the coal, are largely captured (98%) in the fly ash and bottom ash and sent to an on-site landfill. The metallic compounds accounted for 16% of the facility on-site releases and increased in 2003 because of increased fuel use. Ammonia is released in the power production process solely from the use of urea, a pollution control agent used for limiting the formation of oxides of nitrogen to the atmosphere.

Rank #2 - Edge Moor/Hay Road Power Plants - Oil- and coal-fired power plants were required to report under TRI for the first time for 1998. These facilities are located along the Delaware River a mile north of the Port of Wilmington and produce electricity from the combustion of coal, oil, and natural gas.



The Edge Moor/Hay Road power plants reported on nineteen TRI chemicals for 2003. These facilities reported three acid gasses, ten metal compounds, four non-metallic PBT's, nitrate compounds, and ammonia. Acid gas emissions -- hydrochloric acid, hydrogen fluoride and sulfuric acid -- accounted for 96% of on-site releases. Releases of hydrochloric acid deceased from 2002 due to stack test results, and sulfuric acid and hydrogen fluoride increased due to changes in the amounts of oil and coal used. Overall, on-site releases decreased 9% compared to 2002 and are now 89% of the facility 1998 level. Ammonia is released from the facilities solely from the use of urea, a pollution control agent used for limiting the formation of oxides of nitrogen to the atmosphere. All listed compounds except ammonia are formed during the combustion process because of impurities within the fuel. Ammonia is released from the Edge Moor facility solely from the use of urea, a pollution control agent used for limiting the formation of oxides of nitrogen to the atmosphere. Ammonia is also used at the Hay Road facility for pollution control. About 89% of the metal compounds are largely captured in the fly ash and bottom ash. Generally, 100 percent of the captured ash is beneficially reused. It is used, for example, as an additive in concrete, as landfill stabilizer, as flowable fill in construction projects and as a base for road construction. The remaining 11% of metals not captured in ash was released to air and water and accounted for 2% of their total on-site releases.

Rank #3 – Premcor / Motiva Enterprises - The Premcor Refinery, located in the Delaware City industrial complex, refines crude oil into automobile gasoline, home heating oil, and a variety of other petroleum products. The facility, previously known as Motiva, changed ownership to Premcor on May 1, 2004. The 2003 data presented in this report were prepared under Motiva ownership.

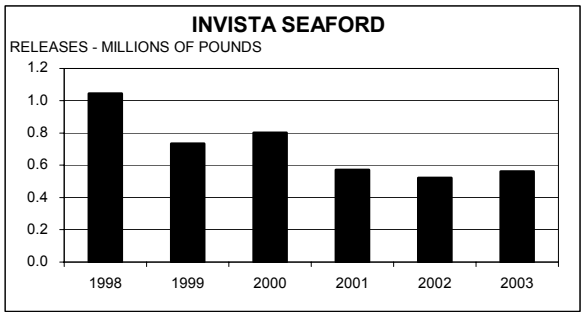


Premcor reported on 46 TRI chemicals for 2003. The facility reported on-site releases increased 24% in 2003 but have decreased 10% since 1998. Sulfuric acid and hydrochloric acid gas emissions accounted for 30% of Premcor's total on-site releases and 70% of on-site air releases. Sulfuric and hydrochloric acids are formed as acid gasses in several units at the facility, including the Fluid Coker, Fluid Cat Cracker, and the on-site power plant that combusts oil and gas. Reported sulfuric acid releases decreased by 160,000 pounds (31%) and hydrochloric acid aerosol emissions decreased by 30,000 pounds (15%) in 2003.

Increases were seen in chromium compounds (59,500 pounds), nickel compounds (55,000 pounds), and vanadium compounds (196,000 pounds), because of the increased gassifier operation burning more coke and producing metallic compounds in the slag. Of these releases, 98% were to landfill. A 219,000-pound increase in nitrate compounds was the result of updating the values based on stream test results.

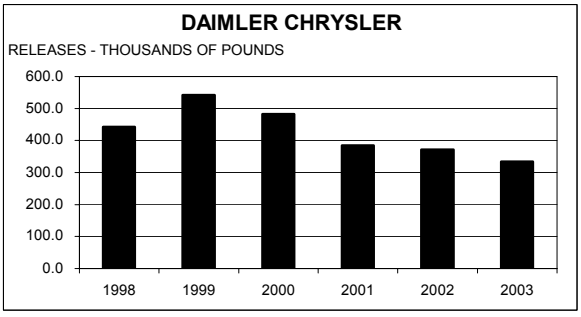
These changes, along with other smaller increases and decreases, resulted in an increase of 333,000 pounds in on-site releases for the facility in 2003.

Rank #4 – Invista / DuPont Seaford - This facility was the first plant worldwide to produce spun nylon fibers, beginning operations in 1939. The spun nylon is used in the apparel industry, in carpeting, and other fabrics applications. The facility also produces nylon flake for export. The facility changed ownership to Invista in 2003.



Invista Seaford reported on 12 TRI chemicals for 2003. Almost 94% of their on-site releases were of three chemicals; hydrochloric and sulfuric acids aerosols to air and nitrate compounds to water. Combustion of coal in the Invista power plant produces hydrochloric and sulfuric acids aerosols released from the stacks. The coal contains small amounts of chlorine- and sulfur-containing compounds that, through the combustion process, convert to acid gases. Nitrate compounds are formed as a by-product of the Invista on-site process wastewater treatment plant. Although this facility reported an increase of 8% in its on-site releases since 2002, on-site amounts released have declined by 46% since 1998.

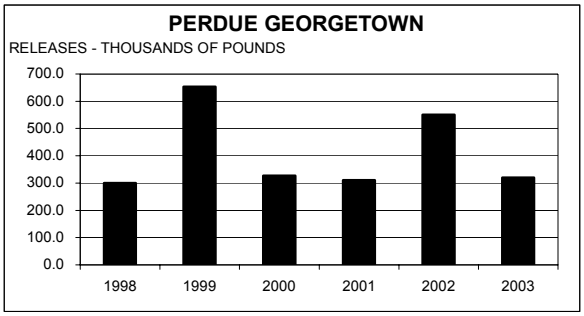
Rank #5 - Daimler Chrysler Newark Assembly Plant - Daimler Chrysler assembles the Dodge Durango SUV for distribution to dealers.



Daimler Chrysler reported on 19 TRI chemicals for 2003. All on-site releases were to the air. Many of these are solvents used in paints or for parts cleaning, while others are materials that are incorporated into the cars themselves, such as ethylene glycol (antifreeze) and methyl tert-butyl ether (gasoline additive). The vehicle body coating process makes use of certain glycol ethers, 1,2,4-trimethylbenzene, methyl isobutyl ketone, n-butyl alcohol, and xylene. These materials are also used elsewhere in the plant. In total, they accounted for approximately 83% of the Daimler Chrysler on-site releases for 2003. Daimler Chrysler accounted for about 71% of certain glycol ethers and 30% of all xylene releases in the state in 2003.

This facility has reduced its emissions of on-site TRI reportable chemicals by 10% since 2002 and by 24% since 1998, and has realized reductions in off-site transfer amounts as well.

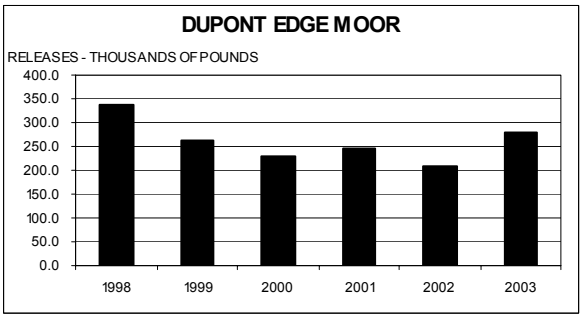
Rank #6 - Perdue Farms - Perdue Farms is a producer of poultry products. The Georgetown facility processes chickens for sale to the retail market.



Perdue Georgetown reported on three TRI chemicals for 2003. The majority of the releases were for nitrate compounds. The Perdue wastewater treatment plant digests ammonia and production waste from the poultry processing plant's wastewater stream and converts some of these wastes to nitrate compounds.

Nitrate compound volume at Perdue's wastewater treatment plant peaked in 1999 when new processing plant procedures dramatically increased the amount of water required to process chickens. Improvements in the wastewater treatment plant operation cut nitrate releases by more than 50 percent in 2000 and 2001, but these amounts have varied in recent years because of changes in the way the amount of nitrate compounds releases are estimated. In 2003, the reported nitrate compound release decreased by 42% compared to 2002.

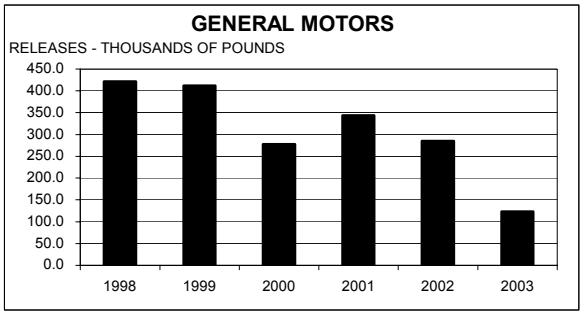
Rank #7 - DuPont Edge Moor - The Edge Moor Plant is one of four domestic DuPont facilities that manufactures titanium dioxide, a white pigment that is used in food-grade markets and in the paint, coatings, plastic, and paper industries. This facility exclusively serves the paper industry. The plant is located along the Delaware River a few miles north of the Port of Wilmington.



DuPont Edge Moor reported on 22 TRI chemicals for 2003. Carbonyl sulfide accounted for 88% of their on-site releases. Carbonyl sulfide is a by-product produced from the use of sulfur-bearing coke in the process of manufacturing the titanium dioxide from titanium-rich ores. Production of the carbonyl sulfide by-product increased by 51% in 2003 and was the result of a longer than normal period of time to stabilize operation of a new chlorinator. This caused a 34% increase in total on-site releases.

Also, dioxins and dioxin-like compounds are created as a result of ore processing. About 99.94% is contained within the solid material sent to an out-of-state landfill facility.

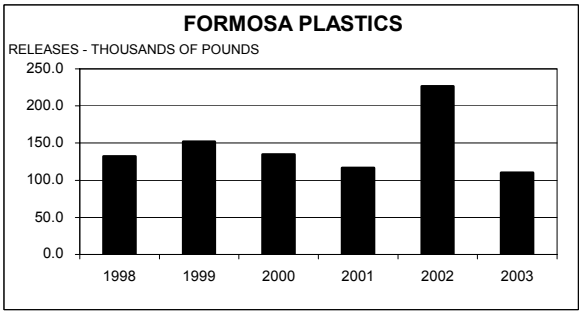
Rank #8 - General Motors Wilmington Assembly Plant - General Motors assembles Saturn automobiles for distribution to dealers.



GM reported on 14 TRI chemicals for 2003. Many of these are solvents used in paints or for parts cleaning, while others are materials that are incorporated into the cars themselves, such as methyl tert-butyl ether (gasoline additive). Almost all on-site releases reported by GM were to the air. Xylene, 1,2,4-trimethylbenzene, certain glycol ethers, and paint solvents used in both the base and top coats accounted for over 96% of their on-site releases in 2003. General motors accounted for about 23% of certain glycol ethers and 56% of all xylene releases in the state in 2003.

Because of eleven weeks of production downtime for inventory adjustments during the year and a three-week supplier strike that resulted in additional downtime, GM Wilmington reported a 57% decrease in on-site release of TRI chemicals in 2003.

Rank #9 - Formosa Plastics - Formosa Plastics, located in the Delaware City complex, produces polyvinyl chloride (PVC) resin for bulk sale to other industries that produce PVC based products, such as containers, flooring, carpet backing, upholstery, toys, and gloves.

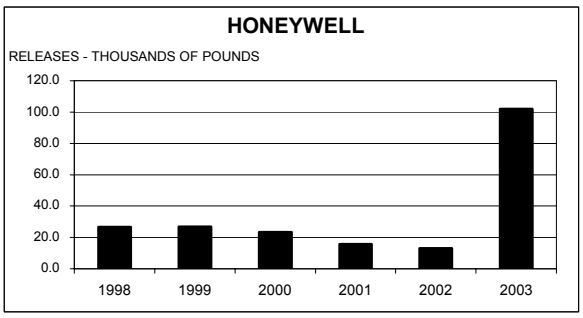


Formosa reported four TRI chemicals for 2003. Vinyl chloride monomer (VCM) accounted for 57% of their on-site releases. VCM is the primary ingredient for producing PVC and is released as residual unreacted monomer during the drying process of the PVC resin. Permits regulate the concentration of the residual monomer in the PVC before drying. Vinyl acetate accounted for 35% of Formosa's on site releases. Vinyl acetate is also a raw material used in certain products and is released through the drying process. Ammonia is also used in several of Formosa's products and is released during the PVC drying process. Ammonia accounted for 8% of Formosa's on site releases. Formosa also reported a small amount of dioxin and dioxin-like compounds in both on-site releases and off-site transfers.

Formosa Plastics initiated better process monitoring and control that reduced vinyl chloride emissions by 39% and vinyl acetate emissions by 67% in 2003. On-site releases in 2003 were lower by 51% compared to 2002.

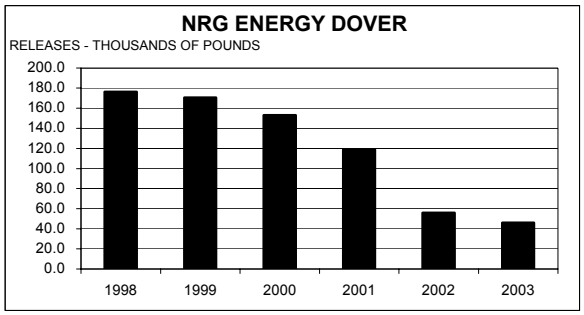
Formosa started using a new basis on which to estimate vinyl acetate releases in 2002, so direct comparison of 2002 and later years with prior years is not possible.

Rank #10 – Honeywell International - Honeywell, located in Claymont adjacent to General Chemical and Sunoco, manufactures specialty chemicals that are used in agricultural, pharmaceutical, and household products. This facility also produces boron trifluoride, used in the production of hydrocarbon resins, lubricants, and adhesives.



The Honeywell facility reported on five TRI chemicals in 2003. Releases of ammonia and n-hexane, used in production of caulking, accounted for about 98% of their total on-site releases. Although production increased 17% in 2003, the primary reason for the increase in on-site releases was that Honeywell performed stack testing in 2003 and the results produced higher than anticipated emissions. Honeywell is currently investing in process modifications that will significantly reduce these emissions.

Rank #11 - NRG Dover Plant - Oil- and coal-fired power plants were required to report under TRI for the first time for 1998. This facility, located on the West side of Dover, produces steam and electricity primarily from the combustion of coal.

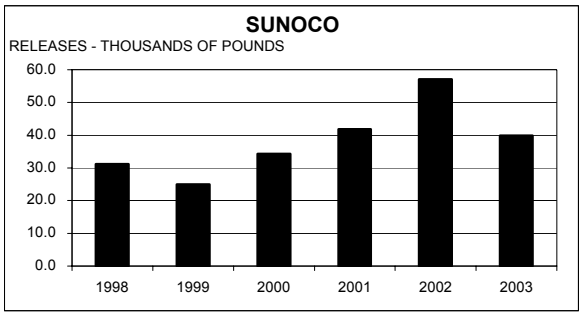


The NRG Dover Plant reported on six TRI chemicals for 2003. Two of these were acid gases formed during the combustion process. Acid gas emissions - hydrochloric acid and sulfuric acid - accounted for over 99% of the facility on-site releases. Small amounts of metal compounds are formed during combustion because of impurities in the coal and are largely (97%) captured in the fly ash and bottom ash and sent to an off-site landfill. The decrease in the 2002 reported releases was the result of using actual coal and mine data as a basis for estimating releases of hydrochloric acid aerosols. This new basis reduced the reported release of hydrochloric acid by 65% (63,000 pounds) in 2002, and the release amount was nearly the same for 2003. Sulfuric acid release in 2003 was lower by 47%. This reduction was the result of the application of a coal-cleaning factor which was included for the first time in the 2003 submission.

Rank #12 – Sunoco Refining and Marketing - Sunoco, located in Marcus Hook, PA extends its facility into the North Claymont area of Delaware. The Marcus Hook facility can process 175,000 barrels a day of crude oil into fuels - including gasoline, aviation fuel, kerosene, heating oil, residual fuel, propane and butane, and petrochemicals. The major petrochemicals are benzene, toluene, xylene, cyclohexane, propylene, ethylene, and ethylene oxide; these are sold to chemical companies, which use them to make a variety of other products.

The portion of the facility in Delaware reported five TRI chemicals in 2003. Ethylene and ethylene oxide account for 94% of the total on-site Delaware releases. Small amounts of

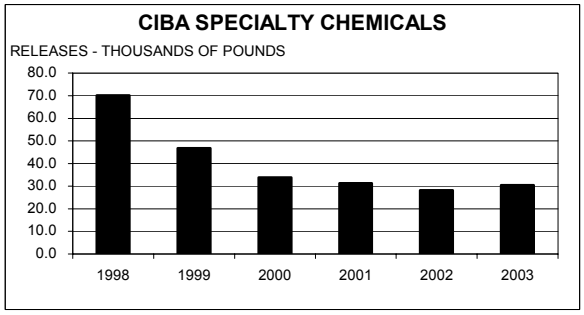
xylene, benzene, and toluene were also reported released to air from tanks. This was the primary reason for the upward trend in 2001.



The ethylene release for 2002 increased by 17,000 pounds then decreased by 20,000 pounds in 2003 because of the number of days the ethylene oxide reactor operated and this was the primary reason for the changing trend in 2002-2003. Ethylene oxide releases, reported for several years in Delaware, have not changed significantly.

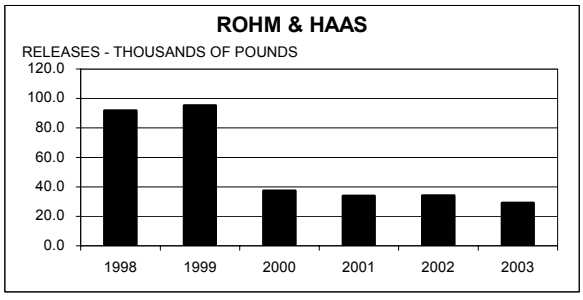
Rank #13 – Ciba Specialty Chemicals - Ciba Specialty Chemicals is located in Newport. Ciba manufactures pigments for the paints, plastic, and printing industries. They reported on six TRI chemicals for 2003. All on-site releases were to air.

The predominant chemical released to air was methanol (93% of total on-site releases). Methanol is used as a solvent in the pigment manufacturing process. A significant portion of methanol used at the facility is recycled. Although production increased 19% in 2003, releases increased only 8%. Ciba has expanded and modernized their operation since 1998. Although production has increased by 36% since 1998, they have achieved a 57% reduction in on-site releases and reduced transfers off-site to water treatment by 72% during this time.



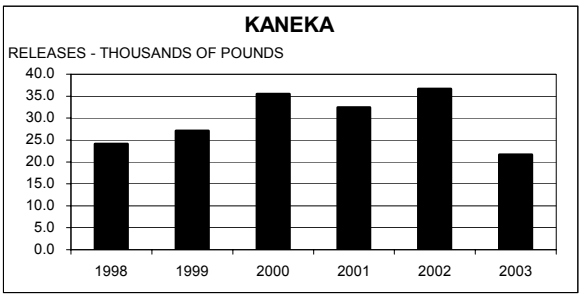
Rank #14 – Rohm & Haas / Rodel – Rohm & Haas Electronic Materials CMP Inc., formerly known as Rodel, changed its name in February 2004. This facility manufactures polishing pads and slurries for the semiconductor, electronics, and glass industries. The facility is located south of Newark in the Diamond State Industrial Park.

Rohm & Haas reported on four TRI chemicals for 2003. Total on-site release decreased 15% in 2003 and is now 32% of their 1998 levels. N,N-Dimethylformamide (DMF), used as a solvent carrier in the polishing pad manufacturing process, accounted for 65% of their on-site releases. Releases of DMF mostly occur through evaporation from the poromerics coating and washing process. The majority of the DMF used is recycled in their distillation equipment for reuse in the process. The 2003 DMF release was 25% of the 1998 level, the result of installing additional controls in 1999.



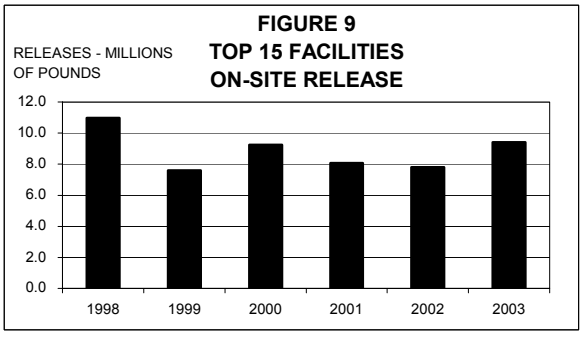
Rohm & Haas is planning additional reductions in DMF releases for 2004. Methyl ethyl ketone (MEK) accounted for 35% of their on-site releases, and is now at 59% of its 1998 level. MEK is used as a solvent carrier in the Impregnation Process. All on-site releases were to air, and were primarily stack emissions from the oxidizer used to control process emissions.

Rank #15 – Kaneka Delaware – Kaneka, located in the Delaware City complex, manufactured Polyvinyl Chloride (PVC) powder for use in PVC based applications including inflatable balls, covers, foam carpet backing, and similar products. This facility closed in late 2003 and is no longer in operation.



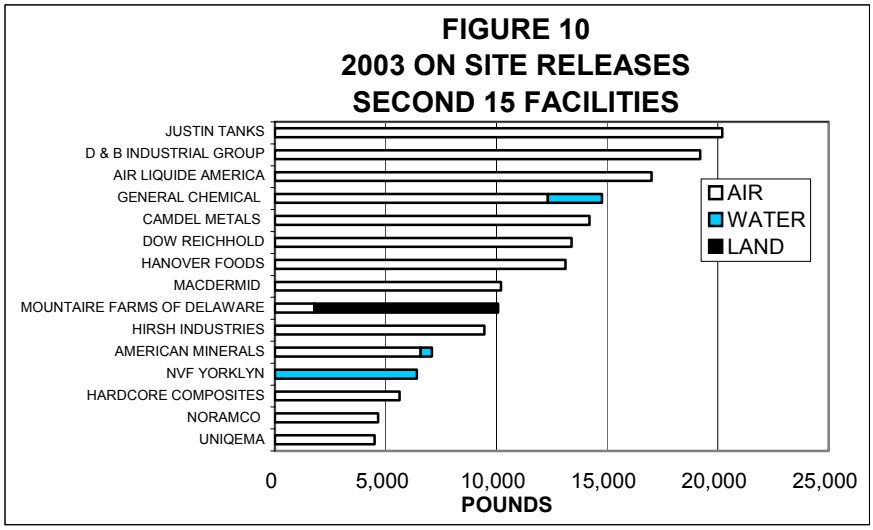
Kaneka reported two TRI chemicals released in 2003; vinyl chloride and hydrochloric acid. Vinyl chloride represented 99% of the Kaneka on-site releases for 2003. Vinyl chloride was released during the drying operations, when unreacted residual vinyl chloride monomer was removed from the finished PVC powder. Permits regulate the concentration of the residual vinyl chloride monomer in the PVC before drying. Because of the facility closure near the end of the year, on-site releases were down by 41% compared to 2002.

Combined Top 15 Facilities Trend – Figure 9 shows the totals for on-site releases for the top 15 facilities during 1998-2003. These facilities represent almost 98% of the total on-site releases in the state for 2003. Six facilities had increases in 2003, the most notable being the Indian River power plant. Nine facilities had decreases. The total on-site release trend for this same group of facilities is down 14% since 1998. Discounting the large increase (1,700,000 pounds) in the hydrochloric acid report from the Indian River Power Plant, statewide on-site releases for the top 15 facilities would have shown a small decrease again in 2003. No adjustments were made to exclude newly reportable chemicals in the years shown on this graph. Additional trends will be presented later in this report, and some of these trends take into account the new reporting requirements.



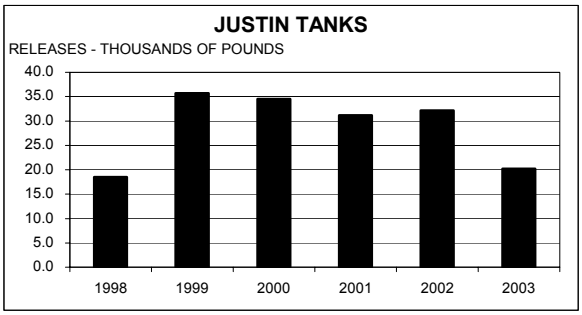
Releases from the Second 15 Facilities

As with the first 15 facilities, a brief description of the second 15 facilities is presented on the next several pages. Although the Second 15 group of facilities released a much smaller amount of TRI chemicals on-site, their operations are an important part of the Delaware economy. Again, the ranking is based on the total facility reported on-site release.



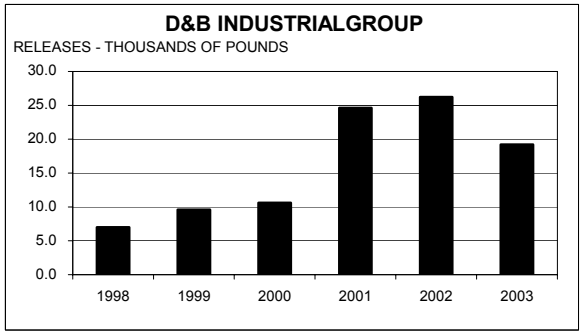
Rank #16 - Justin Tanks – Justin tanks, located in Georgetown, manufactures a wide variety of Fiberglass Reinforced Plastic (FRP) tanks for use in the chemical, agricultural, and food industries.

Justin reported on one TRI chemical, styrene, for 2003. Styrene is used as a monomer in the polymerization of fiberglass resin. The majority of the styrene remains in the resin during the polymerization process, but the curing process releases a small amount to the air after the tanks have been produced. On-site releases have declined 37% since 2002, keeping in line with the downward trend of production.

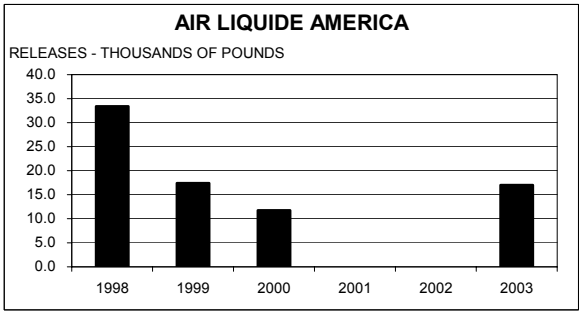


Rank #17 – D&B Industrial Group – D&B is Located in Georgetown adjacent to the airport. D&B manufactures electrical insulating sleeves and bushings for industrial and appliance applications.

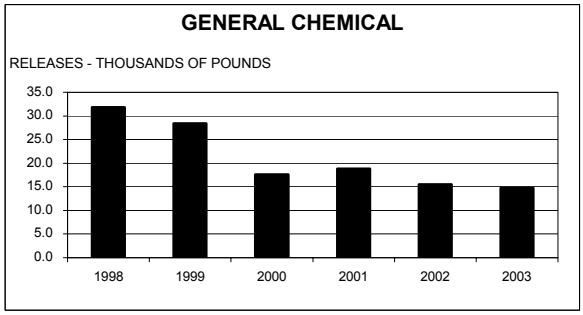
D&B reported one TRI chemical, methyl ethyl ketone. It is used as a solvent in their process. Because of a change in the way MEK releases were calculated, reported on-site releases of MEK have increased by over a factor of 2.5 since 1998. On-site release of MEK declined in 2003, a result of reduced production volume.



Rank #18 - Air Liquide America Air Liquide is located in Delaware City and produces liquified carbon dioxide from a gas stream received from a nearby facility. The carbon dioxide is used in many industrial and food products in the region. Air Liquide reported on one chemical, ammonia in 2003. Ammonia is used in the refrigeration systems that condense the carbon dioxide. The gaps in data for 2001-2002 are because this facility does not meet the threshold for reporting to TRI every year. Although production has increased by 69% since 1998, on-site releases of ammonia have decreased by 49% during this time.

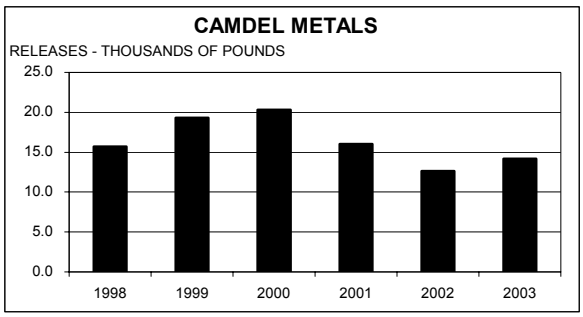


Rank #19 – General Chemical – General Chemical is located in Claymont near the Pennsylvania state line. General Chemical recycled spent sulfuric acid and acid gas in 2002 and earlier. The acid and acid gas came from petroleum refineries that used virgin sulfuric acid as a catalyst in their manufacturing process and needed to regenerate the spent sulfuric acid. The facility produced fluosulfonic acid, regenerated sulfuric acid, sulfur, and other sulfur based products.



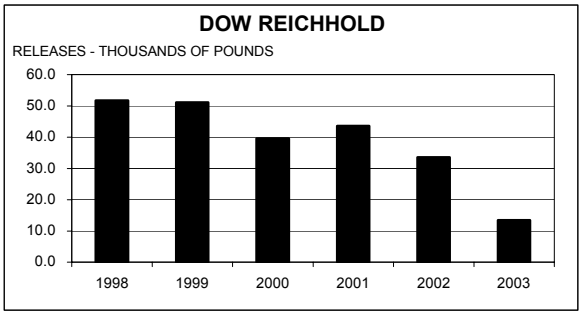
On-site releases have decreased about 50% over the past 5 years. This decrease reflects reductions in operations during 2002-2003. This facility closed its South Plant sulfuric acid regeneration operation in 2003, and its North plant producing fluosulfonic acid and related products in 2004. Current activities at the facility are related to decontamination and remediation.

Rank #20 - Camdel Metals - Camdel Metals manufactures seamless and welded specialty stainless steel tubing. The tubing is used in medical, oil drilling, semiconductor, chemical, and instrumentation applications. The tubing ranges in size from 1/8 to 3/4 inch diameter. Some types may be supplied in coils as long as 25,000 feet.



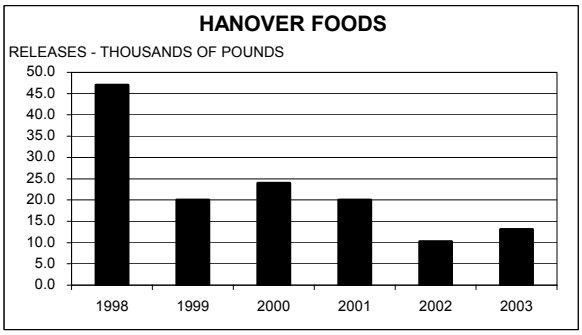
Trichloroethylene is used as a solvent to clean the tubing and accounts for all the facility on-site releases. Camdel Metals reports on-site releases of this chemical each year. A production increase in 2003 accounted for most of the 12% increase in on-site release over 2002. These on-site releases have decreased by 10% since 1998.

Rank #21 - Dow Reichhold – Dow Reichhold is located two miles south of Cheswold. Dow Reichhold produces emulsion polymers, sometimes referred to as latex. These products are sold in bulk liquid form and are used in the manufacture of paper, carpets, textiles, high performance gloves, coatings, and adhesives.



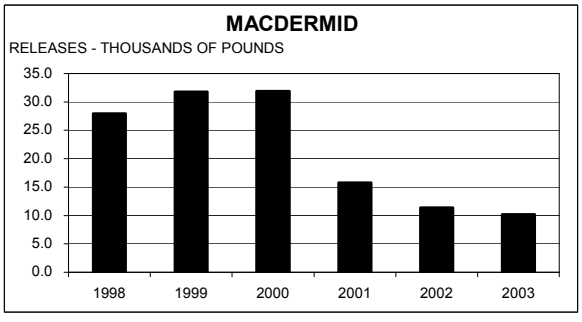
Reichhold reported on 11 TRI chemicals in 2003. Most of these are raw materials used to form the emulsion polymers. Pollution control equipment processed the residual monomers and achieved 98.0-99.9% removal efficiency before releasing its exhaust to the air. Dow Reichhold on-site releases are 26% of 1998 levels. Forty-three percent of their 2003 on-site releases were attributable to 1,3,-butadiene, whose on-site releases are now at 20% of its1998 level. The reductions in 2003 are the result of increased thermal oxidizer uptime, reduced styrene usage, and using a new basis for estimating releases.

Rank #22 - Hanover Foods - Hanover Foods produces a variety of fresh, frozen, refrigerated, and canned vegetables, entrees, and snack foods. Customers for these products are the retail, foodservice, private label, military, club store, and industrial markets.



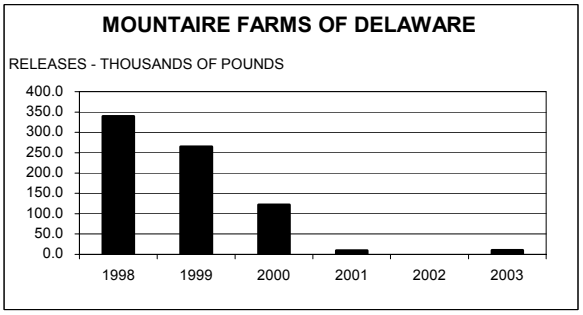
Located in Clayton, the facility freezes fresh vegetables including corn, peas, lima beans, spinach, carrots, and mushrooms, and packages frozen entrees. Hanover reported ammonia releases for the past several years. This was primarily due to leaks and other losses in their refrigeration equipment. These releases increased by 28% in 2003, a result of production increases. Their on-site releases have decreased by 72% since 1998.

Rank # 23 - MacDermid, Inc. - MacDermid, Inc. is a specialty chemical manufacturer. It serves industries that include industrial finishing, electronics, and graphic arts/printing. MacDermid is also a supplier of consumable products and services for the printing, packing, and converting industries worldwide.



Located in Middletown, the MacDermid facility manufactures photopolymer resins, photo-polymer film, and liquid resist compounds. These products are used in the graphic arts, electronics and semi-conductor industries respectively. MacDermid reported on-site releases of Methyl Ethyl Ketone and Toluene Diisocyanate in 2003. Their on-site releases have decreased 64% since 1998 primarily due to the level of production, but process changes have significantly contributed to the decrease as well.

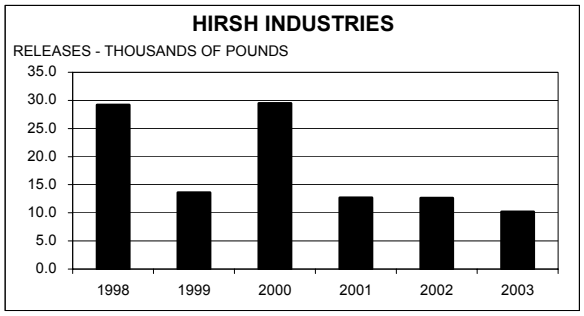
Rank #24 - Mountaire Farms - Mountaire Farms is a producer of poultry products for sale to the retail market.



Mountaire Farms reported on four TRI chemicals for 2003. The majority of the releases in 2003 were for ammonia. Ammonia is used in the refrigeration systems at the facility for process cooling.

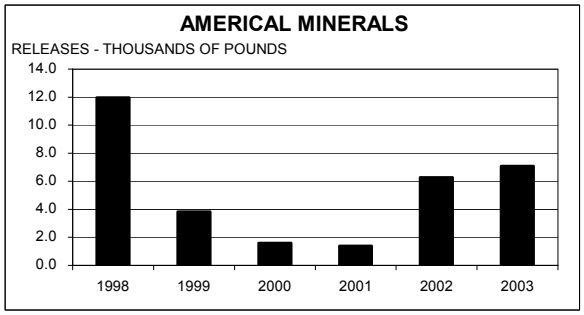
In the 1998-2000 time period, n-hexane was used in a soybean oil extraction process. However, when Mountaire Farms acquired this facility from Townsends Inc. in May 2000, the extraction operation was discontinued and the use of n-hexane and the releases associated with that operation were eliminated.

Rank #25 – Hirsh Industries – Hirsh Industries produces a line of consumer durables. These products include file cabinets, shelving units, and lateral filing systems. These items are used in home and office applications. Hirsh Industries is located on the north side of Dover.



Hirsh reported one TRI chemical, certain glycol ethers. It is used as a paint solvent in their process. On-site releases of certain glycol ethers have decreased by 68% since 1998. This trend is the result of a more effective painting process, improved paint products from their vendors, and improvements in estimating the amounts of release. The amount also varies year-to-year because of production levels and the amount of paint used in the process.

Rank #26 - American Minerals - American Minerals Inc. is a custom processor of naturally occurring ores and minerals. These minerals include manganese, olivine, iron chromite, and magnesite.

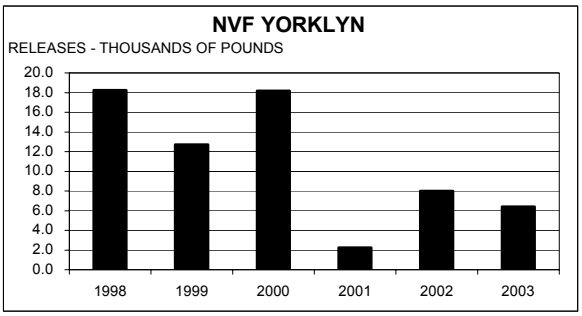


American Minerals is located in New Castle. This facility converts ore materials into products that are utilized by industry and the public on a daily basis such as bricks, steel, and fertilizer. American Minerals grinds, crushes, screens, and blends these materials into products tailored to the specific needs of their industrial, agricultural, and environmental remediation customers.

American Minerals reported on 5 TRI chemicals for 2003. These were all metals or metal compounds. The greatest release was to air for manganese compounds. Although this facility has reduced its on-site releases by 41% since 1998, they did have a 350% increase in 2002 because manganese inventory was increased and the manganese emission factor used to estimate releases was increased. The 13% increase in 2003 was primarily the result of increased manganese inventory and increased production activities.

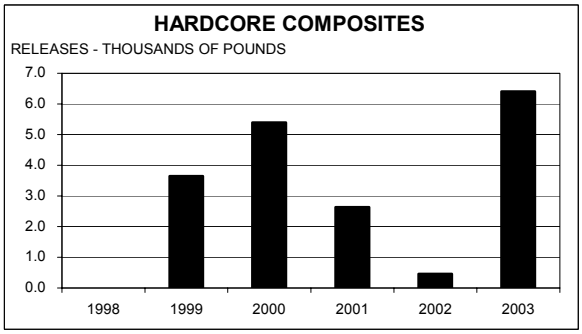
Rank #27 – NVF Yorklyn – NVF Yorklyn produces high density, 100% cellulose, vulcanized fiber products. These products are used for electrical insulation products, tubular fuses, furniture laminates, and abrasive sanding discs. NVF is located in Yorklyn, in northern Delaware near the Pennsylvania state line.

NVF reported one TRI chemical, zinc compounds. The vulcanizing process involves the simultaneous immersion of multiple rolls of cellulose-based paper into a zinc chloride acid bath that gelatinizes them into a single, high density material. The zinc chloride is then leached out and reclaimed internally for reuse. On-site releases are down 65% from 1998, reflecting reductions in operations, weather-related downtime, and improvements in the reclamation process.



Rank #28 – Hardcore composites – Hardcore Composites manufactures large-scale fiber reinforced polymer (FRP) composite structures for infrastructure applications. Hardcore Composites is located in New Castle.

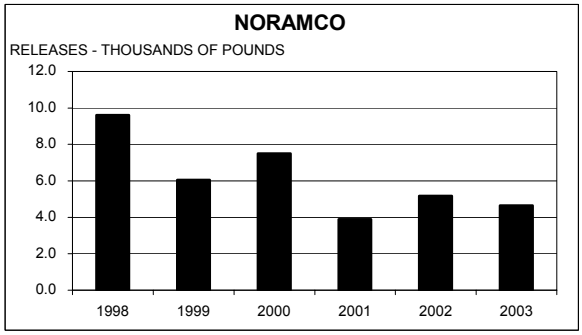
Hardcore products, systems, and components are found in a wide range of large-scale engineered structures. These structures include composite bridge decks and structural repairs, walkways, marine fender systems, and specialty stay-in-place concrete forms.



Hardcore Composites reported release of two chemicals, styrene and formaldehyde, in 2003. Since production volume associated with styrene varies greatly at this facility, release amounts also vary. A large increase in styrene-related production in 2003 accounted for the large increase in their on-site release. The 2004 on-site release is expected to be smaller.

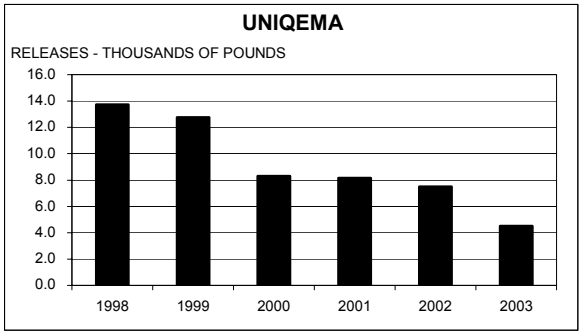
Rank #29 – Noramco - Located in Wilmington, Noramco was formed in 1979. Noramco products include bulk active pharmaceutical ingredients and medical devices.

The pharmaceutical products are primarily sold to Johnson & Johnson pharmaceutical sector finishing facilities in the United States, Argentina, Belgium, Brazil, Ireland, and Mexico. The medical devices are incorporated in medical products used by other Johnson & Johnson companies.



Noramco reported on-site releases of five TRI chemicals in 2003. The largest on-site chemical release was dichloromethane. All on-site releases were to air. Noramco on-site releases have decreased by 52% since 1998, with year-to-year variations reflecting both the level of production and efforts to reduce releases. For 2003, on-site releases were down by 10%, even though production increased 47%.

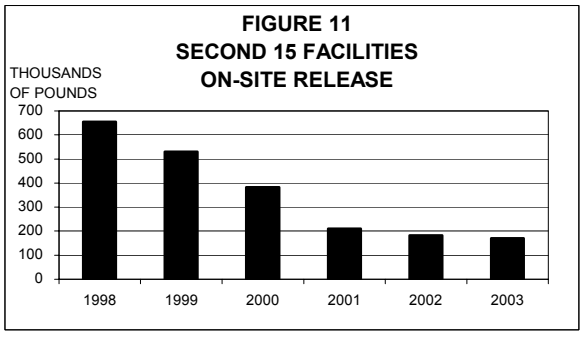
Rank # 30 – UNIQEMA - Formerly ICI Atlas Point, this company has occupied this site located in New Castle near the Delaware Memorial Bridge since 1937.



This facility manufactures products that promote the mixing of oil and water based ingredients in many consumer products, such as baby shampoo, shaving cream, mouthwash, pharmaceuticals, and many other personal care and industrial products.

Uniqema reported on seven chemicals for 2003. The majority of TRI chemicals released were ethylene oxide and propylene oxide. All on-site releases were to air. Uniqema TRI releases have decreased 67% since 1998. For 2003, on-site releases were down by 40% even though production decreased only 8%. This reduction was the result of material handling improvements to reduce releases and process/procedure changes to reduce accidental releases.

Combined Second 15 Facilities Trend - Figure 11 shows the totals for the facilities ranked #16-30 for on-site releases. The trend is down by 74% since 1998. This trend shows a greater percent decrease than the top 15 group, which had a 14% decrease since 1998. Because of the greater decrease in amounts of the Second 15 group, its contribution to the state total decreased from 3% in 1998 to 2% in 2003. Facilities in the Second 15 group tend to be more closely spaced in their rankings with regard to pounds released on-site. This adds to the variability in rankings from year-to-year as individual facility releases vary in their normal course of operations.



Common Toxic Chemicals and their Hazards

Presented here in descending order of the amount released on-site to air, water, and/or land (see Figures 5-7 on pages 11-13) are the top 15 TRI chemicals. This information is presented as a quick reference summary of information for these toxic chemicals. This is not a detailed source of information on the sources, uses, or hazards of these chemicals. This information was obtained from the *Hazardous Substance Fact Sheets* provided by the New Jersey Department of Health and distributed by the EPA. The source for this information is listed in the *For Further Information* section in pages 48-49 of this report. The reader may also consult other chemical or toxicology reference materials to learn more about chemicals of interest. Excerpts for Nitrate Compounds came from EPA *The National Nitrate Compliance Initiative,* April 2002. Excerpts for metallic compounds came from EPA *Risk Burn Guidance for Hazardous Waste Combustion Facilities.*

AIR - From Figure 5 on page 11

Hydrochloric Acid
(Aerosol portion only is reportable)
Used in: Metal processing and cleaning, analytical chemistry, and making other chemicals.
Hazard: Corrosive. Can cause skin and eye burns, irritation of mouth, nose and throat.

Sulfuric Acid
(Aerosol portion only is reportable)
Used in: Fertilizers, chemicals, dyes, petroleum refining, etching, analytical chemistry, metal manufacturing, and explosives.
Hazard: Corrosive. Can cause skin and eye burns, irritation of mouth, nose and throat.

Carbonyl Sulfide
Used in: Chemical manufacturing
Hazard: Can irritate the eyes, nose, and throat and skin, toxic by inhalation and ingestion or skin absorption. High exposure may cause nausea, dizziness, confusion, vomiting, increased or irregular heartbeat.

Hydrogen Fluoride
Used in: Etching glass, manufacturing chemicals and gasoline.
Hazard: Corrosive. Can cause severe irritation to the eyes, nose, throat and skin. Toxic by inhalation and ingestion or skin absorption.

Certain Glycol Ethers
Used in: Solvents.
Hazard: Can irritate the eyes, nose, throat, and skin. Toxic by inhalation and ingestion or skin absorption.

N-Hexane
Used in: Chief constituent of petroleum ether, gasoline, and rubber solvents. Also used in solvents for adhesives, in organic analysis, and in denaturing alcohols.
Hazard: Toxic when inhaled, ingested, or by skin contact. Exposure can cause lightheadedness, giddiness, headaches, and nausea. Flammable liquid and a fire hazard.

Ammonia
Used in: Refrigerant, in manufacturing fertilizer, plastics, dyes, and textiles. A product of natural organic decomposition, run-off from fields and feedlots, waste treatment plant and refinery/chemical manufacturing effluents.
Hazard: May irritate lungs, eyes, nose, throat, and mouth. Corrosive, can severely damage eyes and cause permanent damage. Contact with liquid can freeze skin.

Xylene – Mixed Isomers
Used in: Solvents and in making drugs, dyes, insecticides, and gasoline.
Hazard: Can irritate the eyes, nose, and throat. Toxic by inhalation and ingestion. May cause memory and concentration problems. Repeated exposure may cause low blood cell count.

Vinyl Chloride
Used in: Plastics and chemical manufacturing
Hazard: Carcinogen, mutagen. Toxic by inhalation and ingestion or skin absorption. May cause damage to developing fetus. May damage liver, kidneys, bones, blood vessels, and skin. Exposure may cause you to feel drowsy or lightheaded.

1,2,4,-Trimethylbenzene
Used in: Manufacture of dyes, pharmaceuticals.
Hazard: Toxic when inhaled and by skin contact. Can irritate the nose, throat, and eyes. Contact can irritate the skin. Prolonged contact may cause skin burns. Repeated exposure may damage the liver and kidneys.

N-Butyl Alcohol
Used in: Solvent for fats, resins, waxes, gums, shellac, and varnish. Also used in manufacture of chemicals and oils.
Hazard: Toxic by inhalation and ingestion or skin absorption. May irritate and damage skin and eyes on contact. Breathing high concentrations can cause coughing, wheezing and shortness of breath, can cause headache, nausea, vomiting and dizziness, and may lead to an irregular heartbeat. Exposure may damage the liver, heart, kidneys, hearing and the sense of balance.

Methanol
Used in: Solvents, cleaners.
Hazard: Toxic when inhaled, ingested, or by skin contact. Exposure may cause blindness, nausea, headaches, vomiting, and dizziness. Flammable and a fire hazard.

N-Methyl-2-Pyrrolidone
Used for: Process solvent, paint stripper, industrial cleaners.
Hazard: Toxic when inhaled and by skin contact. May irritate the skin, nose, throat and eyes.

Methyl Ethyl Ketone
Used for: Making plastics, textiles, and paints, as a solvent.
Hazard: Skin irritant, severe eye irritant, exposure to high levels may cause unconsciousness.

Vinyl Acetate
Used for: Plastics and chemical manufacturing
Hazard: Can irritate the eyes, skin, nose, and throat. High levels of exposure can cause dizziness. May damage the lungs. Is a hazardous substance, is flammable and reactive. Is soluble in water and toxic to wildlife.

WATER – From Figure 6 on page 13 - Chemicals not reported in the Air section above

Nitrate & Nitrite Compounds (Sodium Nitrate, Sodium Nitrite)
Nitrates are toxic chemicals that can pose serious risks to human health and the environment. High levels of nitrates may cause significant environmental damage to streams, lakes, and rivers. Elevated levels of nitrates may damage surface water and ground water with excess nutrients and can cause algae blooms in coastal waters, which can remove oxygen from the water and result in fish kills. High levels can displace oxygen from the bloodstream and produce blue color in the skin and lips. The National Academy of Sciences recently reported that pollution by nitrogen and phosphorous were causing damage in most of the nation's coastal inlets, and severe problems were identified in 44 of the 139 coastal areas examined.

Cresol
Used in: Making synthetic resins, photographic developers, explosives. Used in disinfectants and fumigants.
Hazard: Toxic by inhalation or skin exposure. Corrosive, will cause skin and eye burns, possibly blindness. Soluble in water, toxic fish life. Is on the hazardous substances list.

Phenol
Used in: Making plywood, pharmaceuticals, plastics, and rubber. Common product of refinery wastes
Hazard: Toxic by inhalation or skin exposure. Mutagen, can cause genetic changes, will cause skin and eye burns, possibly permanent eye damage. Soluble in water, toxic to fish life. Is on hazardous substances list.

Barium and Barium Compounds *
Used in: Spark plugs and engine rod bearings, and to remove gas from vacuum tubes and television picture tubes.
Hazard: Toxic when inhaled, may irritate skin, eyes, nose and throat.

Manganese and Manganese Compounds *
Used in: Dry-cell batteries, steelmaking, matches, fireworks, in animal feed, fertilizer, livestock nutritional supplements, in glazes and varnishes, and in ceramics, for water purification purposes in water and waste-treatment plants.
Hazard: Toxic when Inhaled. Repeated exposure can cause brain damage, may damage kidneys and liver.

* These metallic compounds are usually by-products produced from impurities in the fuel associated with coal or oil combustion and/or ore processing.

Zinc and Zinc Compounds *
Used in: Rustproof coating on iron and steel, making brass alloys, car parts, electroplating, batteries, electrical products, paints, and fungicides.
Hazard: Zinc oxide fumes (released during welding on galvanized metal) are toxic when inhaled. Zinc dust is a skin irritant.

Benzene
Used in: Used to make other chemicals which are used to make plastics, resins, and nylon and synthetic fibers. Also used to make some types of rubbers, lubricants, dyes, detergents, drugs, and pesticides. Benzene is also a natural part of crude oil, gasoline, and cigarette smoke.
Hazard: Benzene is a carcinogen. Toxic when inhaled or ingested. Exposure to high levels can cause drowsiness, dizziness, rapid heart rate, headaches, tremors, confusion, and unconsciousness.

Copper and Copper Compounds *
Used in: Electrical wiring, plumbing, fungicides, pesticides, electroplating, paint pigments and catalysts.
Hazard: Toxic when inhaled. Can irritate the eyes, nose and throat. May cause a skin allergy. Repeated high exposure to copper may affect the liver.

Toluene
Used in: Solvent for perfumes, medicines, dyes, explosives, detergents gasoline and chemicals.
Hazard: Toxic when inhaled, ingested, and by skin contact. It may damage the developing fetus. Contact can irritate the skin and eyes. Breathing toluene can irritate the nose and throat causing coughing and wheezing. Exposure can affect the nervous system causing trouble concentrating, headaches, and slowed reflexes. Repeated Toluene exposure may cause liver, kidney and brain damage. Highly flammable and explosive.

Vanadium Compounds *
Used in: Steel alloys, other Vanadium compounds, x-ray equipment, sulfuric acid, and synthetic rubber.
Hazard: Toxic when inhaled. Can irritate skin, nose, throat and lungs.

Nickel and Nickel Compounds *
Used in: Alloys and electroplating, catalysts, dyes, and textile printing.
Hazard: Carcinogenic. Toxic by inhalation. Eye and skin irritant. Repeated exposure may cause scarring of the lungs and may affect the kidneys.

Ethlybenzene
Used in: Ethylbenzene is used primarily to make another chemical, styrene. Other uses include as a solvent, in fuels, and to make other chemicals.
Hazard: Toxic by inhalation, will irritate eyes, nose, throat, and skin. Exposure may cause dizziness, lightheadedness, and difficulty in breathing.

* These metallic compounds are usually by-products produced from impurities in the fuel associated with coal or oil combustion and/or ore processing.

Cyanide Compounds, Hydrogen Cyanide
Used in: As insecticide for closed spaces, metal electroplating, and metal treatment.
Hazard: Extremely toxic by inhalation. Will depress the central nervous system. Will cause weakness and loss of coordination, headache, nausea, eye and skin irritation, and in higher concentrations will cause death in humans.

LAND – From Figure 7 on page 13 - Chemicals not reported in the Air and/or Water sections above

Chromium Compounds *
Used in: Stainless and alloy steels, refractory products, tanning agents for leather, pigments, electroplating, catalysts, and corrosion-resistant products.
Hazard: Irritant and corrosive to human tissue, chromium compounds are carcinogens. Hexavalent compounds are more toxic than trivalent compounds.

Lead and Lead Compounds *
Used in: Storage batteries, ammunition, cable covering, ceramic glazes, casting metals and solders.
Hazard: Toxic by ingestion. Can cause brain damage, particularly in children, suspected carcinogen.

Molybdenum Trioxide
Used in: Agriculture, making other molybdenum compounds, ceramic glazes, enamels, pigments, and in analytical chemistry.
Hazard: Toxic when inhaled, may irritate the nose, throat, and bronchial tubes. Repeated overexposure may cause weight loss, diarrhea, poor muscle coordination, headaches, and muscle or joint pain.

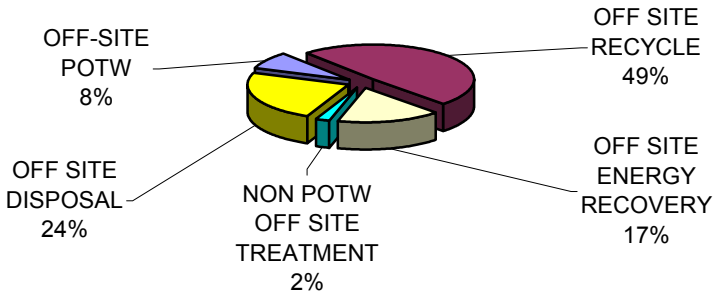
Mercury and Mercury Compounds *
Used in: Thermometers, barometers, vapor lamps, mirror coatings, and in making chemicals and electrical equipment.
Hazard: The nervous system is very sensitive to all forms of mercury. Methylmercury and metallic mercury vapors are more harmful than other forms, because more mercury in these forms reaches the brain. Exposure to high levels of metallic, inorganic, or organic mercury may permanently damage the brain, kidneys, and developing fetus. Effects on brain functioning may result in irritability, shyness, tremors, changes in vision or hearing, and memory problems.

* These metallic compounds are usually by-products produced from impurities in the fuel associated with coal or oil combustion and/or ore processing.

Off-Site Transfers

Off-site transfers are material transfers to off site locations for the purpose of disposal, recycling, energy recovery, or treatment. Treatment could be at a private waste treatment facility or at a publicly owned treatment works (POTW's), typically, a municipal wastewater treatment plant.

FIGURE 12
2003 OFF SITE TRANSFERS



TOTAL: 17,088,774 POUNDS

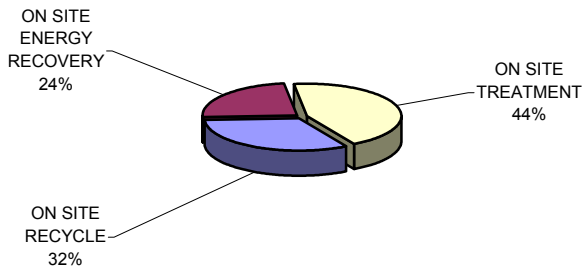
Figure 12 shows the relative portions transferred to the five off-site transfer categories. Table 4 on page 7 shows these values in tabular form. Appendices D and G provide additional detail. TRI Chemicals in wastes are transported by various means through Delaware to their final destinations, many of which are out of state. TRI chemicals were sent to 16 states, some as far away as Arizona and Texas. About 91% of TRI chemicals in all wastes and over 99% of non-POTW wastes that were transferred off-site were sent to out of state locations for further processing and/or disposal.

Off-site transfers account for 18 percent of the total TRI wastes. Off-site transfer to recycle operations accounted for almost half of the amounts within these five categories, and disposals accounted for almost another quarter of the transfers. Almost 90 percent of the transfers to POTW's were to the City of Wilmington POTW, and virtually all transfers to POTW's were to Delaware POTW facilities. Ciba, DaimlerChrysler, and Rohm & Haas combined for 83% of the total TRI transfers to the Wilmington POTW.

On-Site waste Management

On-Site Waste Management is the amount of wastes that never leave the facility site and are managed by the facility on-site. The total amount of TRI chemicals managed on-site is 72 percent of the total TRI chemical waste. This amount is over 7 times the amount of on-site releases. The categories of **Recycle, Energy recovery, and Treatment** are used to define the on-site management of TRI chemical wastes. Figure 13 shows the portions of these wastes processed on-site. Appendices D and G provide additional detail about waste management of these chemicals. **Recycled waste** is the quantity of the toxic material recovered at the facility and made available for further use. **Energy Recovery** includes the quantity of toxic material that had heat value and was combusted in some form of energy recovery device such as a furnace. The **Waste Treatment** segment includes the amount of toxic material that was destroyed in on-site waste treatment operations. Camdel Metals, NVF Yorklyn, Noramco, Rohm & Haas, Medal, Premcor, DuPont Edge Moor, and Occidental Chemical have some of the highest total amounts of on-site waste management.

FIGURE 13
2003 ON SITE WASTE MANAGEMENT



TOTAL: 69,142,528 POUNDS

FIGURE 14
TOTAL 2003 TRI CHEMICAL MANAGEMENT
TOTAL: 95,847,792 POUNDS

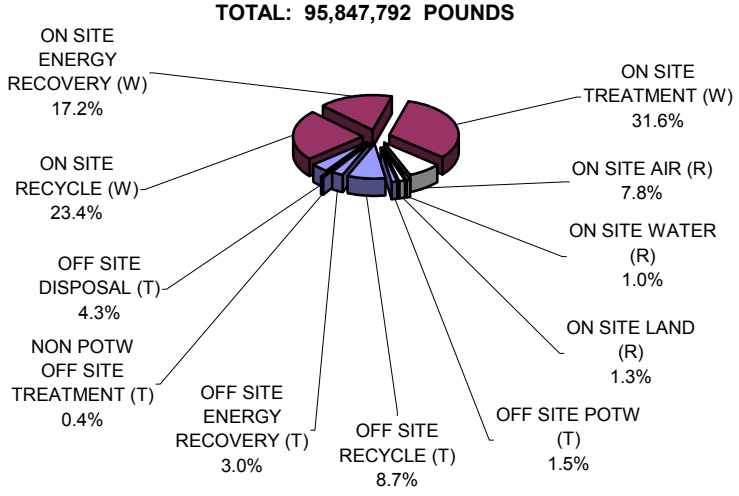


Figure 13 key
(R) – On-Site Release
(T) – Off-Site Transfer
(W) – On-Site Waste Management

Total Waste

Total waste is the combined total of the on-site release, off-site transfer, and on-site waste management portions of the TRI chemical report. Figure 14 provides a perspective of the total TRI chemical waste picture in Delaware. About 10 percent of the total reported TRI waste is released on-site, 18 percent is transferred off-site, and 72 percent is managed on-site through treatment, energy recovery, and recycle operations by the facility generating the waste.

TOXICS RELEASE INVENTORY

Receiving TRI Chemicals in Wastes

When a facility transfers TRI chemical waste off-site, these wastes go to a receiving facility. Some of the receiving facilities report to the TRI program as well, but many do not, based on the reporting requirements shown on pages 1 and 2. Less than one percent of the TRI chemical wastes transferred to Delaware facilities are transferred to a TRI reporting facility. Table 9 provides the total amounts of TRI chemicals received by Delaware facilities from in-state and out-of-state facilities. This data is separated into wastes transferred from other Delaware facilities and wastes transferred from out-of-state facilities. DNREC does not receive reports from any out-of-state facilities that transfer wastes into Delaware. This data was obtained from the U. S. EPA. Some revisions may have occurred since the date of this data.

TABLE 9
SUMMARY OF TRANSFERS IN 2003
TRI CHEMICALS TRANSFERRED TO DELAWARE FACILITIES
FROM OTHER FACILITIES
(in pounds)

DE RECEIVING FACILITY	*TOTAL TRANSFERS FROM DELAWARE FACILITIES*	*TOTAL TRANSFERS TO DELAWARE FROM OUT OF STATE*	*TOTAL TRANSFERS RECEIVED BY DELAWARE FACILITIES*
CANNON SCRAP METAL	7,250	0	7,250
CLEAN EARTH	0	1,477	1,477
D & D DISMANTLING	68,640	0	68,640
DE RECLYCABLE PRODUCTS	143	0	143
DSWA CHERRY ISLAND	281	0	281
DSWA JONES CROSSROADS	31	0	31
DSWA LAMBSON LANE	0	0	0
DSWA SANDTOWN	0	0	0
DUPONT EXPERIMENTAL STATION	0	2,090,968	2,090,968
FIRST STATE RECYCLING	0	183	183
GENERAL CHEMICAL *	4,101	0	4,101
INDUSTRIAL RESOURCE NETWORK	4,540	1,517	6,057
INTERNATIONAL PETROLEUM CORP.	0	17,440	17,440
KENT COUNTY TREATMENT PLANT	97,252	0	97,252
MIDDLETOWN POTW	358	0	358
MILLSBORO TREATMENT PLANT	0	0	0
MOT TREATMENT PLANT	3	0	3
NEW CASTLE DEPT. OF PUBLIC WORKS	2,001	0	2,001
NEWARK RECYCLING	0	0	0
SEAFORD MUNICIPAL TREATMENT PLANT	2,594	0	2,594
TILCON DELAWARE INC.	46	0	46
UNIQEMA *	17,343	0	17,343
VFL TECHNOLOGY CORPORATION	421	15,285	15,706
WILMINGTON WASTEWATER PLANT	1,277,710	12,281	1,289,992
TOTAL TRANSFERS RECEIVED	**1,482,714**	**2,139,152**	**3,621,866**

Source: U.S.EPA 2003 TRI Data Run
* TRI Reporting Facility

The top receiving facility is the DuPont Experimental Station, receiving a variety of chemicals for incineration from other DuPont facilities, all from out of state. The Wilmington POTW received the second largest amount of off-site TRI chemicals in wastewater, and the Kent County Treatment Plant received the third largest amount, primarily from industrial and municipal customers in their regions. The fourth largest receiver of TRI chemicals in wastes is D&D Dismantling, receiving metals from Camdel Metals. These four receiving facilities account for 98% of all TRI chemicals received from in-state and out-of-state TRI facilities.

Persistent Bioaccumulative Toxic (PBT) Chemicals

Persistent Bioaccumulative Toxics (PBT's) are receiving increased scrutiny as we learn more about them, and reporting PBT's is also being emphasized to an increasing degree. These chemicals are of particular concern because they are not only toxic, but because they remain in the environment for long periods of time, are not readily destroyed, and build up and accumulate in body tissues. The EPA established substantially lower reporting thresholds in 2000 for 15 chemicals and three chemical categories that are highly persistent and bioaccumulative in the environment. Starting in 2001, lead and lead compounds (except lead contained in stainless steel, brass, or bronze alloys) have reduced thresholds of 100 pounds compared to the 25,000/10,000 thresholds prior to that time. Table 2 on page 3 shows the lower thresholds for all PBT's. Therefore, not all of the PBT chemicals released in prior years were reportable, even though it is likely they were released at or near the current reported rate. For example, 21 facilities reported lead or lead compounds in 2002 and 2001 and 19 in 2003 compared to seven in 2000. All of these facilities were in operation prior to 2001.

Table 10 shows the results of PBT reporting for 2001-2003, compared to total 2003 TRI data. PBT on-site releases for 2003 comprise about 0.3% of the total TRI on-site releases. PBT on-site releases were higher by 18% for 2003 compared to 2002, but total PBT waste decreased by 9%. Not enough years have passed to provide a meaningful trend since the lead threshold change in 2001. Form A may not be used to report PBT's.

TABLE 10
2003 TRI PBT DATA SUMMARY
(IN POUNDS)

	All Data 2003	PBT's only 2003	PBT's only 2002	PBT's only 2001
No. of Facilities	84	28	32	23
No. of Form A's	55	-	-	-
No. of Form R's	323	62	66	51
No. of Chemicals	103	11	11	12
On-site Releases				
Air	7,436,246	4,938	5,282	5,681
Water	916,287	311	784	3,659
Land	1,263,958	22,116	17,166	21,852
Total Releases	9,616,491	27,365	23,232	31,192
Off-site Transfers				
POTW's	1,432,790	2,013	818	521
Recycle	8,366,885	4,575,042	5,053,729	4,570,954
Energy Recovery	2,834,075	-	0	-
Treatment	370,126	0	1	0
Disposal	4,084,899	70,592	69,178	61,680
Total Transfers	17,088,774	4,647,648	5,123,727	4,633,155
On-site Waste Mgmt.				
Recycle	22,404,667	7,185	3,960	4,075
Energy Recovery	16,455,440	-	-	210
Treatment	30,282,421	710	390	400
Total on-site Mgmt.	69,142,528	7,895	4,350	4,685
Total Waste	95,847,792	4,682,908	5,151,309	4,669,032

Table 11 on the next page shows the amounts of each PBT chemical reported released by the TRI reporting facilities in 2003. Lead compounds, reported at 21,362 pounds, made up 94% of the total on-site PBT releases and 99% of the transfers off-site. Although the Dover Air Force Base Small Arms Range was top reporter for on-site lead release in 2001, it did not report any lead release for 2002-2003. Johnson Controls again reported the top amount of lead transferred off-site, to recycling. Johnson Controls has been reporting on lead compounds since 1987.

Mercury on-site release decreased 29% due to a decrease in the amount reported from Occidental Chemical, but mercury compounds increased 14% due to an increase in the reports from the Indian River and Edge Moor Power Plants. Occidental Chemical was the sole contributor to the 776 pounds of mercury released on-site. The Indian River Power plant reported a 4,000-pound increase in the on-site release of lead compounds. Halko reported the top amount of on-site PBT chemical waste management with 5,000 pounds of lead being recycled on-site. Appendix I Shows the PBT data detail, listing each facility reporting each PBT chemical.

TABLE 11
2003 PBT RELEASE SUMMARY
(IN POUNDS)

PBT CHEMICAL	ALL REPORTS ARE FORM R REPORTS	ON-SITE RELEASES				TRANSFERS OFF SITE	ON-SITE WASTE	TOTAL PBT WASTE
		TOTAL AIR	TOTAL WATER	TOTAL LAND	TOTAL			
Benzo(g,h,i)Perylene	10	1	4	0	5	1	390	396
Dioxin and Dioxin-Like Compounds	7	0	0	0	0	91	0	90.8638
Hexachlorobenzene	1	0	5	0	5	4,292	0	4,297
Lead	5	5	49	48	102	19,265	5,000	24,367
Lead Compounds	14	3,718	230	21,661	25,609	4,613,508	0	4,639,117
Mercury	2	760	16	0	776	8,176	2,182	11,134
Mercury Compounds	7	326	0	407	733	114	0	847
Octachlorostyrene	1	0	0	0	0	1,877	0	1,877
Pentachlorobenzene	2	16	3	0	19	205	0	224
Polychlorinated Biphenyls (PCB's)	1	0	0	0	0	49	0	49
Polycyclic Aromatic Compounds	12	112	3	0	115	71	323	508
TOTALS	**62**	**4,938**	**311**	**22,116**	**27,365**	**4,647,648**	**7,895**	**4,682,908**

Source: 2002 DNREC database November 2004
(1) Dioxins are reportable in grams and have been converted to pounds.

NATIONAL PERSPECTIVE

The national 2003 TRI report has not been released by the U.S. Environmental Protection Agency (EPA) as of the writing of this report. However, placing the 2003 Delaware reports alongside the 2002 EPA reports yields some rankings that provide a perspective for Delaware in the national TRI picture. Changes in the 2003 national values may change these rankings.

This data shows that Delaware ranks 44th in the nation in total on-site releases for all TRI chemicals. For on-site releases, 58 facilities in the nation each released more individually than all the facilities in Delaware combined. Delaware provided 0.23% of the total on-site release amounts nationwide.

Some facilities in Delaware do rank near the top of the national rankings for specific releases. DuPont Edge Moor ranks #1 in the nation for off-site transfer of dioxin and dioxin-like compounds. Formosa Plastics ranks #5 in the nation for on-site release of vinyl chloride and #18 for on-site release of vinyl acetate. Occidental Chemical ranks #5 for mercury on-site air release and #17 in the nation for mercury total on-site release. DaimlerChrysler ranks #16 for on-site release of n-methyl-2-pyrrolidone and #28 for on-site release of 1,2,4-trimethylbenzene. Premcor/Motiva ranks #34 for on-site release of cyanide compounds. The Indian Rover power plant ranks #54 and the Edge Moor/ Hay Road Power Plants rank #85 for on-site release of hydrochloric acid. The Indian River Power Plant ranks #96 for total on-site release of all TRI chemicals.

TREND ANALYSIS

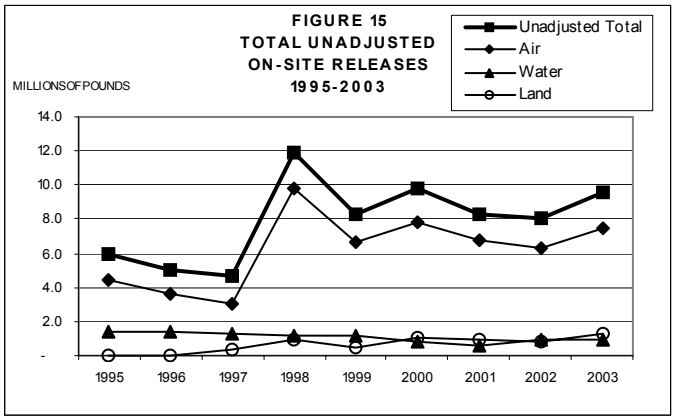
TRI data is available back to 1987. Changes in the reporting requirements over time have caused an increase both in the number of chemicals and in the types of facilities subject to reporting. As explained on pages 2-4, two of the most significant changes to TRI reporting occurred in 1995 and 1998, when large increases in chemicals (1995) and facilities subject to reporting (1998) occurred. The analysis presented in this section uses 1995 and 1998 as base years for presenting trends for all chemicals and facilities (not adjusted) and for only chemicals and facilities subject to reporting over a specific time span (adjusted). Table 12 and Figure 15 show the results of reporting during the entire 1995-2002 period and are **not adjusted** for any changes in reporting requirements.

TABLE 12
1995-2003 TRI DATA SUMMARY
(IN POUNDS)
NOT ADJUSTED FOR CHANGES IN REPORTING REQUIREMENTS

	1995	1996	1997	1998	1999	2000	2001	2002	2003
No. of facilities	75	77	74	80	76	80	82	83	84
No of Form A's	33	40	34	75	72	61	57	55	55
No of Form R's	228	220	242	277	254	310	316	316	323
No. of Chemicals	90	98	100	106	101	109	104	106	103
On-site Releases									
Air	4,483,402	3,586,182	2,995,461	9,796,431	6,651,166	7,841,010	6,796,679	6,281,846	7,436,246
Water	1,394,739	1,395,328	1,328,937	1,126,527	1,197,861	866,312	573,937	928,813	916,287
Land	28,678	42,409	317,243	937,708	462,579	1,103,632	965,666	814,385	1,263,958
Total On-Site Release	5,906,819	5,023,919	4,641,641	11,860,666	8,311,606	9,810,954	8,336,282	8,025,044	9,616,491
Off-site Transfers									
POTW's	3,214,800	4,522,131	4,301,095	3,286,302	2,996,401	2,199,807	1,575,732	1,201,161	1,432,790
Recycle	17,127,835	10,054,483	10,612,518	12,002,926	9,295,315	8,649,678	8,845,326	9,248,730	8,366,885
Energy Recovery	2,427,102	1,173,331	1,663,440	1,491,543	1,389,936	2,543,840	2,642,626	2,538,090	2,834,075
Treatment	910,090	1,297,004	688,661	630,761	894,822	901,604	183,567	398,572	370,126
Disposal	2,767,339	2,905,928	4,010,594	3,983,506	3,056,466	3,816,862	3,878,689	4,196,691	4,084,899
Total Transfers	26,447,166	19,952,877	21,276,308	21,395,038	17,632,940	18,111,791	17,125,940	17,583,245	17,088,774
On-site Waste Mgmt.									
Recycle	29,100,208	29,882,121	32,996,062	34,549,050	32,671,856	31,188,694	24,133,885	25,033,817	22,404,667
Energy Recovery	332,834	219,184	19,255,280	16,155,665	22,981,591	29,095,221	25,863,740	15,740,469	16,455,440
Treatment	55,990,904	51,590,060	69,425,233	68,475,327	69,501,151	64,401,679	40,713,952	33,373,385	30,282,421
Total on-site Mgmt.	85,423,946	81,691,365	121,676,575	119,180,042	125,154,598	124,685,594	90,711,577	74,147,670	69,142,528
Total Waste	117,777,931	106,668,161	147,594,524	152,435,746	151,099,144	152,608,339	116,173,799	99,755,959	95,847,792

NOT ADJUSTED FOR CHANGES IN REPORTING REQUIREMENTS EXCEPT PBT'S AS NOTED
SOURCE: DNREC 2003 DATABASE, NOVEMBER 2004

On-Site Releases 1995-2002



On-site releases include emissions to the air, discharges to bodies of water, and releases at the facility to land including placement in on-site landfills. Figure 15 shows the trend of on-site releases without adjustments. The increase in 1998 was due to the change in reporting requirements as explained on page 3, causing a large increase in the number of facilities required to report. Unadjusted on-site releases increased 20% (1.6 million pounds) since 2002 primarily because of the Indian River Power Plant hydrochloric acid report, but have decreased 19% since the peak in 1998.

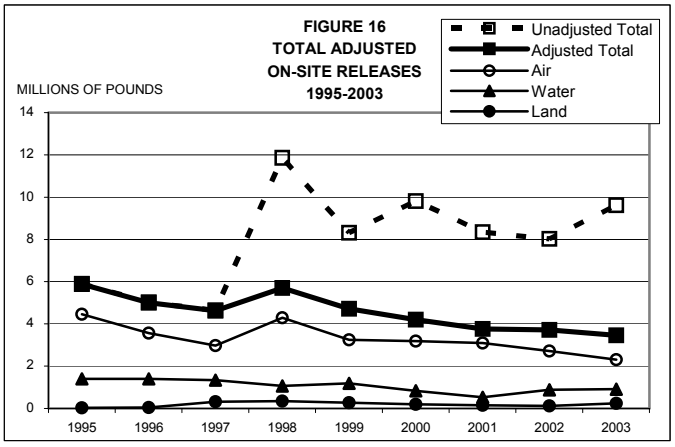
When the new facilities and chemicals that were added starting in 1995 are removed from the trends, the adjusted result is shown in Table 13 and Figure 16. Table 13 shows the adjusted amounts of TRI chemicals in all categories that were reported in 1995-2003. This table is adjusted to show only those facilities and chemicals that were reporting in 1995 and later.

TABLE 13
1995-2003 TRI DATA SUMMARY
(IN POUNDS)
ADJUSTED FOR CHANGES IN REPORTING REQUIREMENTS

	1995	1996	1997	1998	1999	2000	2001	2002	2003
No. of facilities	73	75	73	69	66	67	68	69	69
No of Form A's	28	34	29	30	32	31	31	34	35
No of Form R's	221	212	237	240	231	241	235	229	239
No. of Chemicals	87	94	98	103	98	101	95	97	94
On-site Releases									
Air	4,466,247	3,569,898	2,973,704	4,286,680	3,246,228	3,179,802	3,095,916	2,709,022	2,304,121
Water	1,394,739	1,395,328	1,328,937	1,066,787	1,186,041	826,660	524,281	884,057	904,351
Land	28,678	42,409	317,243	347,129	278,319	194,448	144,956	117,249	243,873
Total Releases	5,889,664	5,007,635	4,619,884	5,700,596	4,710,588	4,200,910	3,765,154	3,710,327	3,452,345
Off-site Transfers									
POTW's	3,214,795	4,511,126	4,301,090	3,286,189	2,996,375	2,199,732	1,575,639	1,200,858	1,432,235
Recycle	17,127,835	10,054,483	10,544,518	11,963,716	9,295,315	8,613,087	8,833,437	9,217,843	8,351,340
Energy Recovery	2,427,102	1,173,331	1,663,440	1,491,543	1,389,936	2,543,840	2,642,626	2,538,090	2,834,075
Treatment	897,090	1,277,004	675,561	611,696	894,822	899,534	172,939	398,571	370,126
Disposal	2,767,339	2,905,928	4,010,594	3,719,902	2,985,340	3,472,927	3,572,487	3,825,836	3,678,483
Total Transfers	26,434,161	19,921,872	21,195,203	21,073,046	17,561,788	17,729,120	16,797,128	17,181,199	16,666,258
On-site Waste Mgmt.									
Recycle	29,100,208	29,882,121	32,996,062	34,549,050	32,671,856	31,188,654	24,133,520	25,033,532	22,404,664
Energy Recovery	332,834	219,184	19,255,280	16,155,665	22,981,591	29,095,220	25,863,740	15,740,469	16,455,440
Treatment	55,811,179	51,424,487	68,575,887	67,199,660	69,149,944	63,829,320	40,100,727	32,400,941	29,082,696
Total on-site Mgmt.	85,244,221	81,525,792	120,827,229	117,904,375	124,803,391	124,113,194	90,097,987	73,174,941	67,942,800
Total Waste	117,568,046	106,455,299	146,642,316	144,678,017	147,075,767	146,043,224	110,660,269	94,066,467	88,061,403

ADJUSTED FOR CHANGES IN REPORTING REQUIREMENTS

SOURCE: DNREC 2003 DATABASE, NOVEMBER 2004



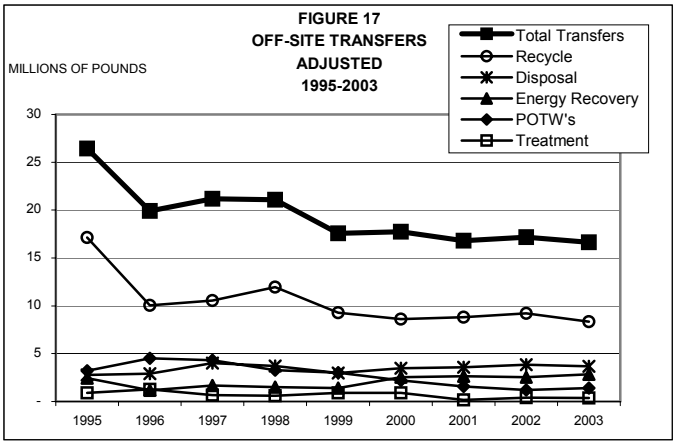
Overall, adjusted on-site releases decreased 7% (258,000 pounds) in 2003 following a 1% decrease in 2002. Since 1995, adjusted on-site releases have decreased 41%. Facilities such as the power plants, newly reporting facilities, and chemicals such as PBT's at their lower thresholds are not shown in the adjusted trends unless they were already being reported in or prior to 1995. The following trends for 1995-2003, in addition to Figure 16, are also based on this adjusted data. Significant changes in 2003 include:

FACILITY	CHEMICAL	MEDIA	AMOUNT (pounds)
Perdue Georgetown	Nitrate compounds	Water	-230,000
Formosa Plastics	Vinyl Acetate	Air	-77,000
Premcor/Motiva	Nickel Compounds	Land	+60,000
Invista/Dupont Seaford	Nitrate Compounds	Water	+73,000
Honeywell	N-hexane	Air	+87,000
Premcor/Motiva	Vanadium Compounds	Land	+220,000

Some of these changes have been caused by changes in the way the facility estimates amounts, and many of these changes were discussed in the top 15 or second 15 facility profiles. You may contact the facility for a more in-depth discussion of the reasons for specific changes. The changes noted in the sample above were balanced by smaller increases and decreases from other facilities.

Off-Site Transfers 1995-2003

An Off-site transfer is a transfer of toxic chemical in wastes to another facility that is physically separate from the reporting facility. Chemicals are reported as transferred to an off-site facility when they are transported away from the reporting facility for the purposes of treatment at a publicly owned treatment works (POTW), recycling, energy recovery, treatment, or disposal. As discussed on page 34, the receiving facility may be in Delaware or another state. Although the off-site transfers may be of less immediate concern than on-site releases, transfer to categories such as POTW's, treatment, and disposal still represent toxic chemicals in wastes that must be ultimately accounted for. As noted on page 34 and in Table 13 on page 40, the amounts transferred off-site are much greater than the amount of on-site releases. Figure 12 on page 34 shows the relative amounts for each activity in 2003, and Figure 17 below shows the trends in amounts of TRI chemicals in wastes transferred off site since 1995. The amount of chemicals reported since 1999 shows a relatively flat trend. As noted in prior analysis on page 34, about half of the off-site transfers are to recycling operations.



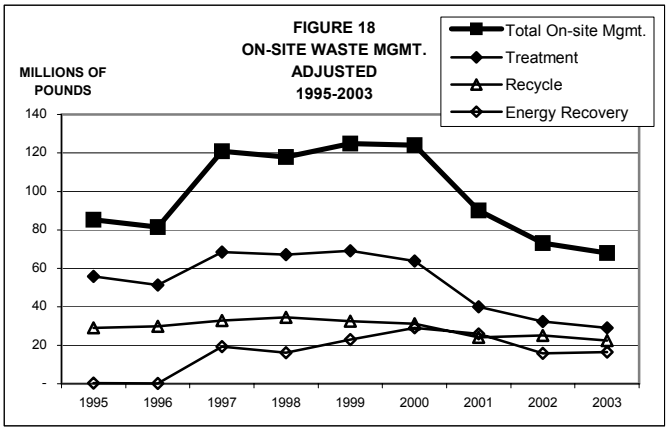
The total trend in Figure 17 is driven by the trend in amounts sent to off-site recycle. The total adjusted net change in 2003 was a decrease of 3.3% (-559,000 pounds) from 2002, and the total adjusted trend is down by 37% (-9,812,000 pounds) since 1995. In recent years, smaller increases or decreases have caused the adjusted trend total to become relatively flat. Significant changes in 2003 are:

FACILITY	CHEMICAL	METHOD	AMOUNT (pounds)
Citisteel	Zinc Compounds	Recycle	-305,000
Johnson Controls	Lead Compounds	Recycle	-256,000
Halko	Lead Compounds	Recycle	-189,000
DuPont Edge Moor	Manganese Cpds.	Disposal	-104,000
Ciba	Methanol	Recycle, Energy Rcv.	-132,000
Ciba	Methanol	POTW	+101,000
Honeywell	n-Hexane	Treatment	+185,000
Noramco	Methanol	Treatment, Energy Rcv.	+269,000

The total changes were balanced by other smaller increases and decreases from other reports at other facilities.

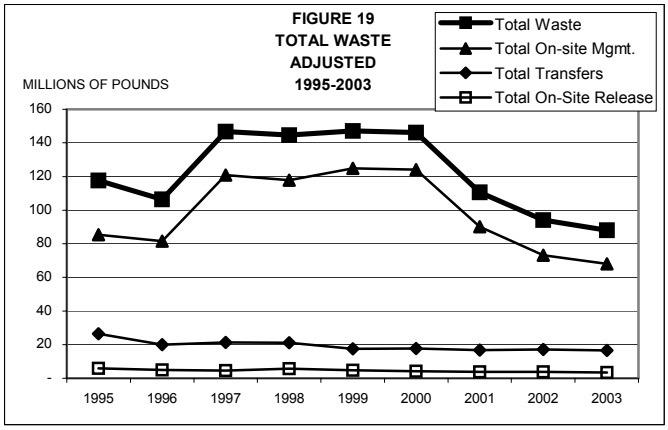
On-site Waste Management 1995-2003

In some facilities, wastes were managed on-site instead of being sent off-site for processing or disposal. On-site waste management is the processing of chemicals in wastes that do not leave the site of the reporting facility. When chemicals are recycled, recovered for energy, or treated at the facility, they are reported as managed on-site. Although these amounts represent a loss of finished product to the facility as waste, they are not as much of a threat to the environment as the other categories since these amounts are managed and not disposed of on-site. There is, of course, the risk that these chemicals may be released accidentally on-site to the environment during the waste management process.



The trends for the three categories of on-site management are shown in Figure 18 and the amounts in Table 13 on page 40. The total amount of waste managed on-site in 2003 was down 5 million pounds (7%) from 2002. Recycle amounts declined 11% and treatment decreased 10%, while energy recovery increased 5%. Significant changes in 2003 are:

FACILITY	CHEMICAL	METHOD	AMOUNT (pounds)
NVF Yorklyn	Zinc Compounds	Recycle	-4,045,000
DuPont Edge Moor	Hydrochloric Acid	Treatment	-2,982,000
Occidental Chemical	Chlorine	Treatment	-885,000
MacDermid	Methyl Ethyl Ketone	Energy Recovery	-860,000
Noramco	Dichloromethane	Recycle	-782,000
Ciba	Methanol	Recycle	+342,000
Premcor/Motiva	Cyanide Compounds	Energy Recovery	+450,000
MacDermid	Methyl Ethyl Ketone	Treatment	+825,000
Premcor/Motiva	Ammonia	Energy Recovery	+1,000,000



These changes were balanced by other smaller increases and decreases from other reports. Total pounds for on-site waste management have decreased by 20% since 1995.

Total Waste 1995-2003

Figure 19 shows the three waste categories taken from the totals in Figures 15, 16, and 17, and their grand total. This grand total is largely driven by on-site waste management. Pounds for total waste have decreased by 6% since 2002 and 25% since 1995.

On-Site Releases 1998-2003

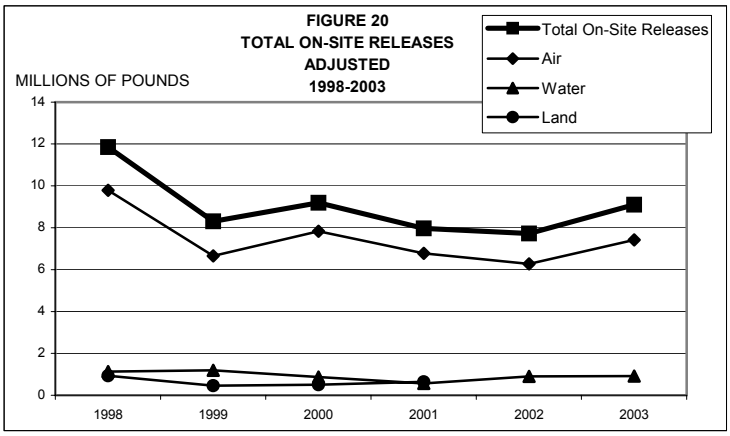
The second set of trends is for the 1998-2003 period. The new industry segments added in 1998 that were excluded in the 1995-2003 trends are included here. Because of the inclusion of additional facilities in 1998, the totals in Table 14 are higher than those in Table 13. Figure 20 shows the trend for on-site releases adjusted for new facilities and their chemicals added after 1998. As in the unadjusted on-site trend (Figure 15), the trend is up in 2003 because of the Indian River Power Plant hydrochloric acid report increase. Although there was an 18% increase in 2003, there has been a decrease of 23% in on-site releases over the 1998-2003 period. In addition to the notes in the facility profiles and notes on pages 39-41 about how on-site waste releases may have changed this year, reports of significant reductions for facilities and/or chemicals added in 1998 and reporting in 2003 are: Edge Moor/ Hay Road Power Plant reported reduced hydrochloric acid aerosols (-250,000 pounds). As noted earlier, a significant increase in hydrochloric acid aerosols (+1,700,000 pounds) was reported by the Indian River Power Plant. This facility also reported an increase in sulfuric acid aerosols (+42,000 pounds. Changes in the amounts of each type of fuel (coal, oil, or gas) used, as well as the demand for electrical power and the basis the facility used for estimating releases are responsible for the changes in the electric generating facilities' acid gas releases.

TABLE 14
1998-2003 TRI DATA SUMMARY
(IN POUNDS)
ADJUSTED FOR CHANGES IN REPORTING REQUIREMENTS

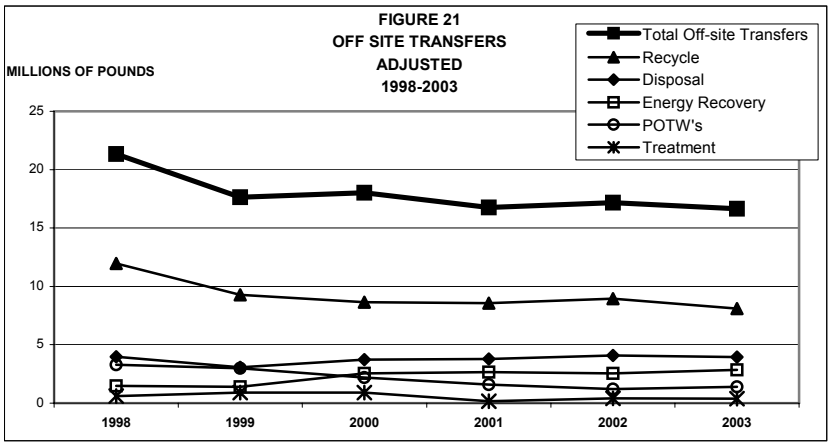
	1998	1999	2000	2001	2002	2003
No. of facilities	79	76	80	80	75	77
No. of Form A's	70	72	61	57	55	55
No. of Form R's	271	254	278	283	254	265
No. of Chemicals	105	101	102	99	98	95
On-site Releases						
Air	9,787,574	6,651,166	7,827,465	6,779,991	6,271,185	7,424,428
Water	1,126,527	1,197,861	864,760	558,611	900,317	912,493
Land	937,708	462,579	500,395	636,925	556,219	765,842
Total On-Site Releases	11,851,809	8,311,606	9,192,620	7,975,527	7,727,720	9,102,763
Off-site Transfers						
POTW's	3,286,297	2,996,401	2,199,804	1,575,700	1,201,157	1,388,640
Recycle	11,963,926	9,295,315	8,649,611	8,578,821	8,960,521	8,111,171
Energy Recovery	1,491,543	1,389,936	2,543,840	2,642,626	2,538,090	2,834,075
Treatment	611,996	894,822	900,353	172,939	398,571	370,126
Disposal	3,983,506	3,056,466	3,712,460	3,775,364	4,070,122	3,955,520
Total Off-site Transfers	21,337,268	17,632,940	18,006,068	16,745,450	17,168,462	16,659,532
On-site Waste Mgmt.						
Recycle	34,549,050	32,671,856	31,188,654	24,133,520	25,033,532	22,404,664
Energy Recovery	16,155,665	22,981,591	29,095,220	25,863,740	15,740,469	16,455,440
Treatment	68,126,327	69,501,151	64,400,679	40,713,762	33,373,135	30,282,031
Total On-Site Mgmt.	118,831,042	125,154,598	124,684,553	90,711,022	74,147,135	69,142,135
Total Waste	152,020,119	151,099,144	151,883,241	115,431,999	99,043,317	94,904,430

ADJUSTED FOR CHANGES IN REPORTING REQUIREMENTS
SOURCE: DNREC 2003 DATABASE, NOVEMBER 2004

FIGURE 20
TOTAL ON-SITE RELEASES
ADJUSTED
1998-2003

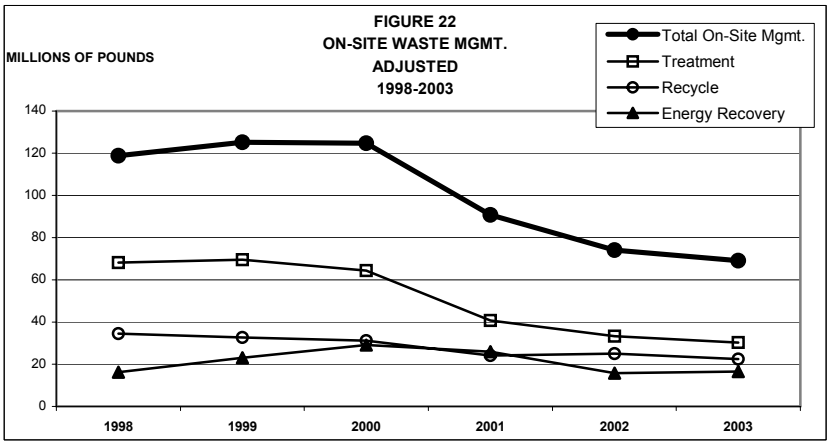


Off-Site Transfers 1998-2003

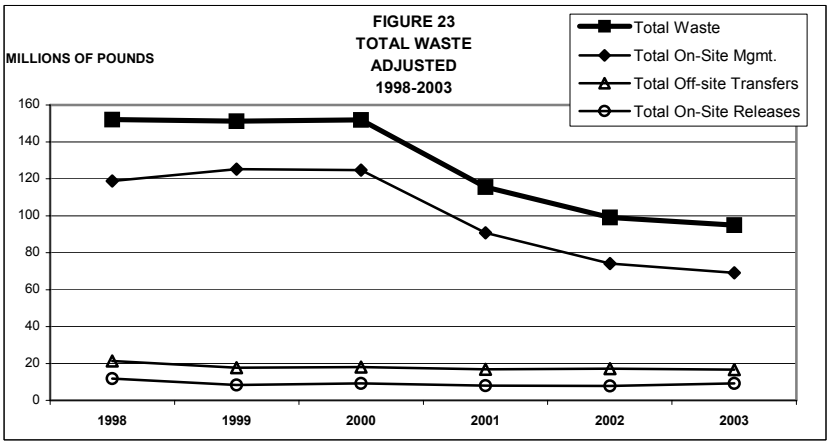


Off-site transfers trends were relatively unchanged in 2003. Table 14 and Figure 21 show the amounts transferred off-site, adjusted for the new reporting requirements starting in 1998. Off-site transfers decreased 3% in 2003, and have decreased 22% since 1998. There are no facility notes not already mentioned on page 41 for off-site transfers in this time period.

On-Site Waste Management 1998-2003



The trend of on-site management of TRI chemicals in waste shows a continuing downward trend in 2003 due to declines in two of the three waste management activities as shown in Table 14 and Figure 22. There are no significant changes for these new facilities in addition to the previously noted 5 million pound (7%) decline in 2003 and the 1995-2003 facility notes for on-site waste management on page 42.

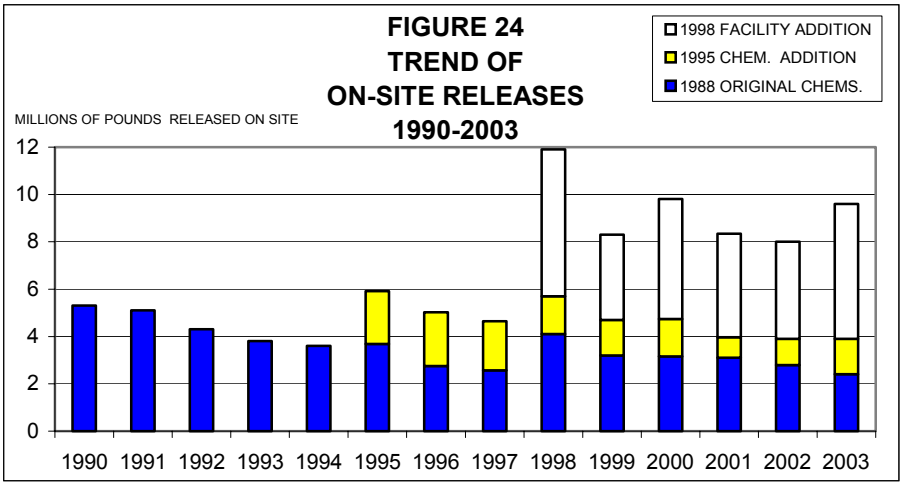


Total Waste 1998-2003

Figure 23 shows the sum of On-Site Releases, Off-Site Transfers, On-site Waste Management, and their grand total. The 2002-2003 trend is down by 4%, and the 1998-2003 trend is down by 38%, again driven by on-site waste management.

Effect of Chemical and Facility Group Additions, 1990-2003

As mentioned earlier, groups of chemicals and facilities were added to the TRI program over the years. The analysis on page 40 started in 1995 and removed the major group of facilities that were added in 1998 to show the trend of constantly reportable groups of facilities and chemicals over time. Figure 24 shows the effect of starting in 1990 and following the trend of each group since is was added to the TRI program.



The trend of each group and the reports affecting the trends were discussed in the preceding portions of this section. The original group, as well as each new group, shows a generally decreasing trend over time. The table below shows the amount in millions of pounds for each group at the time it was added and in 2003. The increase in amounts reported is the result of the additions. If each group had remained constant, amounts reported for 2003 would be 13.7 million pounds instead of the 9.6 million pounds actually reported. The reporting facilities have effected a reduction of 4.1 million pounds, or 30%.

GROUP	STARTING YEAR AMOUNT	2003 AMOUNT	CHANGE
Original Facilities and Chemicals	5.3	2.4	-2.9
1995 Chemical Addition	2.2	1.5	-0.7
1998 Facility Addition	6.2	5.7	-0.5

Amounts are in Millions of Pounds

Carcinogens Trend, 1995-2003

The number of Carcinogen reports decreased by six to 97 in 2003, and the total number of carcinogen chemicals decreased by three to 29 following a large increase in the number of lead and lead compounds reporting facilities in 2001 (because of the reduced reporting threshold). The trend of all on-site carcinogens was down by 2% in 2003. The increases and decreases this year are the result of normal changes in the business of the facilities and some changes in the estimating basis they used in reporting these TRI chemicals. Carcinogens are classified into three groups by IARC, the International Agency for Research on Cancer: Group 1 - Known, Group 2A - Probable, and Group 2B – Possible. Total on-site releases of all Carcinogens decreased by 16% since 1995 and by 31% since the peak in 1998 caused by the addition of new facilities. On-site releases of TRI carcinogens comprise 6.1% of all TRI chemical on-site releases in 2003, down from 7.5% in 2002. A list of carcinogens reported in Delaware in 2003 is provided on page 4. Table 15 on the next page provides the individual data and overall totals for each of the IARC classes of carcinogens, and Figure 25 on the next page shows the trend of on-site carcinogen releases in Delaware.

TABLE 15

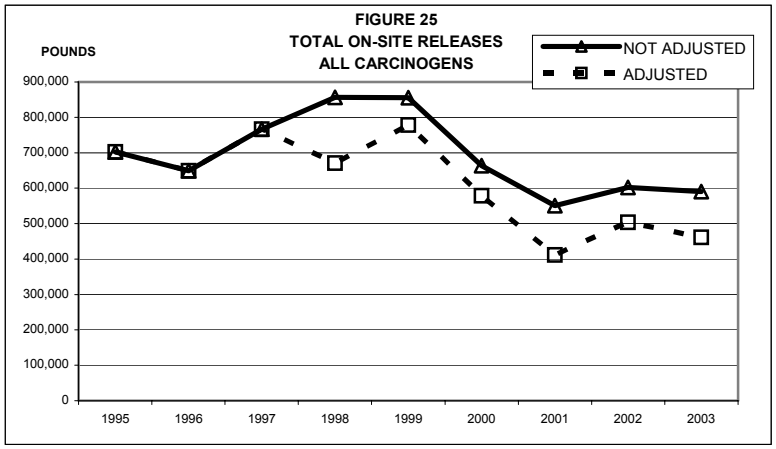
1995-2003 CARCINOGENS

ON-SITE RELEASES, NOT ADJUSTED

	1995	1996	1997	1998	1999	2000	2001	2002	2003
KNOWN									
AIR	253,818	225,184	192,099	209,094	219,970	209,828	209,295	177,473	127,464
WATER	596	201	6,917	10,246	3,048	4,395	9,114	9,682	9,339
LAND	1,791	331	286,041	363,793	306,630	258,008	169,197	170,074	308,076
KNOWN TOTAL	256,205	225,716	485,057	583,133	529,648	472,231	387,606	357,229	444,879
PROBABLE									
AIR	113,482	78,491	55,274	53,558	139,293	55,418	44,326	35,581	24,216
WATER	0	0	0	0	0	0	0	0	4
LAND	0	0	0	0	0	0	0	0	0
PROBABLE TOTAL	113,482	78,491	55,274	53,558	139,293	55,418	44,326	35,581	24,220
POSSIBLE									
AIR	331,904	344,888	223,518	167,420	186,506	135,946	91,851	189,296	98,269
WATER	359	351	196	1,175	290	271	4,873	2,109	1,431
LAND	0	5	2,550	51,625	142	40	21,607	17,475	21,714
POSSIBLE TOTAL	332,263	345,244	226,264	220,220	186,938	136,257	118,331	208,880	121,414
TOTAL AIR	699,204	648,563	470,891	430,072	545,769	401,192	345,472	402,350	249,949
TOAL WATER	955	552	7,113	11,421	3,338	4,666	13,987	11,791	10,773
TOTAL LAND	1,791	336	288,591	415,418	306,772	258,048	190,804	187,549	329,790
GRAND TOTAL	701,950	649,451	766,595	856,911	855,879	663,906	550,263	601,690	590,512

Source: DNREC TRI 2003 Database, November 2004

Table 15 contains only the unadjusted values. As with the prior trends, adjustments must be made for changes in reporting requirements in this period, and the trends of both unadjusted and adjusted values are shown in Figure 25 below. Chemicals and facilities required to report only during a portion of the period because of changes in reporting requirements have been excluded for the entire time for the "Adjusted" trend in Figure 25. These adjustments generally involve the power generating and ore processing industries and include metallic compounds produced from impurities in the fuel and raw materials used by these facilities. These facilities were required to start reporting in 1998. Adjustments occurring in this period affected the air, water, and land release amounts. New reports for lead and lead compounds at their lower thresholds starting in 2001 accounted for 25,000 pounds of exclusions in 2003. Prior years' lead and lead compounds reports under the higher thresholds were not excluded if the facility was already reporting them. Table 3 on page 4 shows the number of facility reports for each IARC-classified chemical, and additional carcinogen report detail is in Appendix J.



Known Carcinogens

Land releases of all known carcinogen compounds (5) were 52% of carcinogen total on-site releases and 93% of all carcinogen on-site land releases. Premcor/Motiva and the Indian River Power plant reported virtually all of the nickel compound releases to land. From 1997-2000, the land release of nickel compounds, a product of fuel combustion at Premcor/Motiva, greatly influenced the values for known carcinogens. Their 1997 value was 283,000 pounds. Now, although their amount is lower at 136,000 pounds, it remains a significant contribution to the 165,000-pound total, and nickel compounds remain highest in the Known Carcinogen category. Chromium compounds, 95% released to land and also a product of fuel combustion, are second at 143,000 pounds, with Premcor/Motiva and the Indian River Power Plant again contributing virtually all these releases.

Air releases of known carcinogens have been gradually declining, now 50% of the high in 1995. Vinyl chloride contributed 66% of the known carcinogen category air releases in 2003. Vinyl chloride constitutes over 34% of all carcinogen air releases and 14% of carcinogen total on-site releases for air, water, and land in 2003. Vinyl chloride, with a total release of 84,000 pounds and released by Formosa and Kaneka, is third in the known carcinogen category. Formosa Plastics released 63,000 pounds of vinyl chloride and Kaneka reported 21,000 pounds to air in 2003. Benzene reports to air, now mostly from Premcor/Motiva and Sunoco, have declined from 58,000 pounds in 1995 (from Premcor and the now closed Metachem facility), to 6,700 pounds in 2003. Benzene made up 5% of the known carcinogen air releases.

Water releases on-site of known carcinogens are 2.1% of the known carcinogen total. Benzene and nickel compounds contributed 90% of the known carcinogen release to water.

Probable Carcinogens

All probable category carcinogens (7) were released to air during this period. The largest air release contributors were trichloroethylene, reported by Camdel Metals, and 1,3,-butadiene, reported by Dow Reichhold. They combined for 87% of the probable carcinogen releases. The trend for trichloroethylene release has declined 51%, from 29,332 pounds in 1995 to 14,235 pounds in 2002. The trend for 1,3,-butadiene, down 60% in 2003, is now at 6,865 pounds and only 9% of the 72,439 pounds reported in 1995. The probable carcinogen air release high in 1999 (139,923 pounds) in Table 15 was due to an 83,000-pound reported release of formaldehyde from Motiva. The probable air total for 2003 is 24,216 pounds.

Possible Carcinogens

There are 17 chemicals in this category. The top release in this category is vinyl acetate, 98% (39,000 pounds) of which is released by Formosa Plastics. The Formosa report accounts for 32% of the total category release. This release was estimated using a higher basis starting in 2002. Although the Formosa reported amount is much higher than the 12,000 pounds reported for 2001, the actual amount may not be much different from prior years because of the change in basis. Styrene, 56% of which is released by Justin Tanks, is the second highest on-site release for this class. Styrene accounts for 30% of the total release for this category. The Justin Tanks' trend has decreased 19% since 1995, and total styrene releases have decreased by 13% over the 1995-2003 period.

As before, in ***Limitations of TRI Data*** on Page 6, we urge caution when using this data, as THIS DATA DOES NOT INDICATE AMOUNT OF HUMAN EXPOSURE.

TOXICS RELEASE INVENTORY

FOR FURTHER INFORMATION

Access to the TRI Files - DNREC is responsible for collecting, processing, and distributing information submitted by Delaware facilities under the TRI program. This 2003 TRI report may be viewed at: www2.state.de.us/serc/reports.htm. Additional information not contained in this report is available to the public through the EPCRA Reporting Program located within DNREC. A second, less technical data summary is available at the same location. A searchable database is located at: http://www2.state.de.us/serc/search/index.htm.

The reports submitted by facilities are available for review through the Freedom of Information Act process from DNREC's Air Quality Management Office located at 156 South State Street in Dover. Custom reports can also be generated from the database. For information on placing a request, call the TRI Coordinator at (302) 739-4791 during business hours. An on-line FOIA application is also available at: http://www.dnrec.state.de.us/air/aqm_page/foia.htm.

Chemical Data Fact Sheets - A two-page fact sheet is available for most TRI chemicals reported in Delaware and contains information on chemical characteristics, health hazards, and ecological effects. These fact sheets were prepared by the EPCRA Reporting Program from information obtained through EPA's more lengthy TRI chemical fact sheets. The two-page fact sheets are available upon request. Additional TRI chemical information is available at: www.epa.gov/triinter/chemical/index.htm

EPA's TRI Home Page - The TRI home page provides information on the many facets of the TRI program at EPA, including an Executive Summary, Q&A's, a link now to the 2002 TRI data, and later this year to 2003 data, a current list of reportable chemicals, reporting forms, state and federal program contacts, and various guidance documents available for downloading. This website has many links to other EPA and non-EPA sites associated with TRI. www.epa.gov/tri/

Toxics Release Inventory Public Data Release - EPA's annual TRI report. It covers information nationwide and provides a good perspective on how Delaware compares to other states www.epa.gov/tri/tridata/index.htm . The 2003 edition of this report will be available later this year and will available for review at the DNREC office at 156 South State Street in Dover. It can also be obtained by calling the federal EPCRA Information Hotline at 1-800-424-9346.

Envirofacts Electronic Warehouse - Envirofacts is an EPA-developed website that provides public access to multiple environmental databases, including TRI. Links are available to data about hazardous waste, water permits, drinking water, Superfund sites, air, water, toxics, and more. On-line queries allow the user to retrieve data and create reports, as well as generate maps. www.epa.gov/enviro

Right-to-know Network - Searchable nationwide TRI data is available through RTKNet. The RTKNet was established by two non-profit organizations to provide access to TRI and chemical data, link TRI with other environmental data, and exchange information among public interest groups. www.rtk.net

Delaware Public Health Cancer Rates and Causes -This site provides data and answers to many cancer-related questions. http://www.state.de.us/dhss/dph/dpc/cancer.html

The Office of Pollution Prevention & Toxics is a part of the EPA that:

- Promotes pollution prevention as the guiding principle for controlling industrial pollution;
- Promotes safer chemicals through a combination of regulatory and voluntary efforts;
- Promotes risk reduction so as to minimize exposure to existing substances such as lead, asbestos, dioxin, and polychlorinated biphenyls; and,
- Promotes public understanding of risks by providing understandable, accessible and complete information on chemical risks to the broadest audience possible.

It is also a link to *Risk-Screening Environmental Indicators.* This model was developed by EPA's Office of Pollution Prevention & Toxics as a risk-screening tool that provides a relative comparison of TRI releases. This application is available on CD-ROM or through the Internet. Both of these are available through: www.epa.gov/opptintr

Delaware's Pollution Prevention Program can be accessed at: http://www.dnrec.state.de.us/dnrec2000/pollutionprevention.asp

Environmental Defense Fund Scorecard - The EDF Scorecard combines scientific, geographic, technical, and legal information from many databases (with emphasis on TRI) to enable users to produce detailed local reports on toxic chemical pollution. Chemical profiles and a map generator are also available through the Scorecard. www.scorecard.org

2003 Delaware Air Quality Report - The annual air quality report is prepared by the Air Surveillance Branch in the Air Quality Management Section of DNREC. This report presents data gathered from a statewide network of air monitoring stations, and includes analyses, trends, and other information regarding Delaware's ambient air quality. For a copy of the report, or for more information, please call (302) 323-4542. This report is available on-line at: www.dnrec.state.de.us/air/aqm_page/reports.htm The EPA site for additional air quality information is: http://www.epa.gov/oar/oaqps/publicat.html

Delaware's Department Of Natural Resources and Environmental Control has a variety of environmental information, publications, and reports available at: www.dnrec.state.de.us/dnrec2000/Elibrary.asp In addition to TRI, there are other provisions of the Emergency Planning and Community Right to Know Act (EPCRA), which provide information to the public as well as to local emergency planning and response organizations. Delaware has its own EPCRA statute which established these provisions under state law. For additional information, visit the Delaware EPCRA website at: http://www2.state.de.us/serc/epcra.htm

Questions or comments regarding the TRI program are welcome. Please direct questions, comments, or requests to:

TRI Coordinator
EPCRA Reporting Program
Air Quality Management Section
Division of Air and Waste Management, DNREC
156 South State Street
Dover, DE 19901
Tel. (302) 739-4791, Fax (302) 739-3106
E-mail: john.parker@state.de.us

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